ROM

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DINO-EGG HUNTERS: Succeeding in the clutch / **FROM THE LOST WORLD:** A remote river in Guyana reveals a strange new kettle of fish / *Ancestry.DNA:* The surprising find of an archaeologist's search for ancestral roots / *Plus:* **JAMES CHATTO** on piscatorial platters and MARK KINGWELL on living forward

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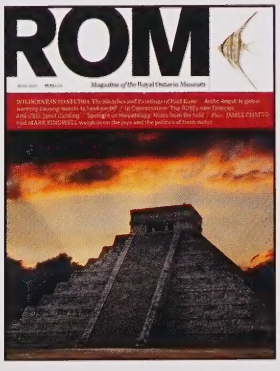
ROM

Magazine *of the* Royal Ontario Museum

Figure of a stallion, Alexandre Kéléty (active c. 1918–1940), retailed by *Etling et Cie*, Paris, France. Probably late 1920s. ROM 2003.109.5
Gift of Bernard and Sylvia Ostry. From *High Style: Masterworks from the Bernard and Sylvia Ostry Collection in the Royal Ontario Museum*, published by ROM Press



For more than 40 years, *ROM* magazine and its forerunner *Rotunda* have captivated readers and brought the Royal Ontario Museum into their homes. A quarterly publication, *ROM* provides compelling stories of ancient civilizations, fabulous artifacts, ecology, biodiversity, and our place in the cosmos. *ROM* magazine appeals to adventurous and intellectually curious individuals both locally and internationally. It is read in 42 countries. To explore advertising opportunities in *ROM*, please visit www.rom.on.ca/media/pdf/mediakit.pdf or call 416.586.5652. To subscribe to *ROM*, please contact www.rom.on.ca/magazine or call 416.586.5870.

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H.M.S. *Royal William* (c. 1760). The 100-gun warship transported General Wolfe's body back to England after his death on the Plains of Abraham. John Cleverley the Elder, oil on canvas.

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ON THE COVER

Natural history (main image): *Giganotosaurus*, a top predator of the Late Cretaceous. Illustration: Courtesy Julius T. Csotonyi

World cultures: Pendant with an eagle, gold with filigree wire and garnet inlays, Roman, 200–300 CE. In the 2nd century CE, Romans favoured eye-catching ornaments richly embellished with stones and glass-paste settings. ROM 2004.22.1. Photo: Brian Boyle, ROM

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Saturday through Thursday: 10 am to 5:30 pm; Friday: 10 am to 8:30 pm

ROM LIBRARY
Public hours: Monday, Wednesday, and Friday: 10 am to 4:30 pm; Tuesday: 10 am to 5:30 pm

ADMISSION PRICES
ROM Members: FREE*
Adults: $15
Students and seniors with ID: $13.50
Children (4 to 14 years): $12
Infants 3 and under: FREE

Discount admission on ROM Friday Nights, presented by SunLife Financial, from 4:30 pm to 8:30 pm: Adults $9; Students and seniors with ID $8; Children $6. Feature exhibitions are an additional $10 for adults, $9 for seniors/students, and $5 for children.

Admission is free on Tuesdays for post-secondary Canadian students with ID.

Museum and Arts Pass Program participant.

**All adult Members must present a valid membership card and photo ID. Membership cards are not transferable except for RPC Members.*

Photo: H.M.S. *Royal William*, ROM 959.283. Gift of Dr. Sigmund Samuel.

Our Contributors

Adrienne Desjardine
TECHNICIAN

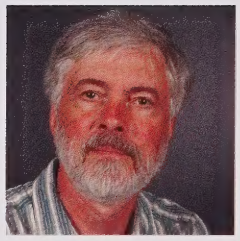
A collections technician for the ROM's New World Archaeology section, Adrienne Desjardine ("Article of Faith," From the Collections) studies, manages, and cares for a diversity of artifacts and archives, ensuring they are preserved for the enjoyment and study of future generations. Growing up next to the Rouge Valley in Toronto, Desjardine developed an early appreciation for history while rummaging for fossils in the idyllic, natural environment. Her fascination with the pre-Contact axes and arrowheads she found eventually led her to study archaeology. Her work has taken her to Africa and Mexico; in both places she has contributed to cultural preservation, research, and education through her collections-management efforts. A favourite part of her work is chancing upon forgotten gems in the collections such as the Jesuit ring discussed in her story.

David Evans
ASSOCIATE CURATOR

Fascinated with dinosaurs since he first laid eyes on them during a ROM visit as a child, David Evans ("Nesting Instinct") now oversees the ROM's dinosaur research program and is cross-appointed as assistant professor at the University of Toronto. His research focuses on plant-eating dinosaurs and their role in Cretaceous terrestrial ecosystems. Because new discoveries have the potential to change our perception of the history of life, David is active in the field searching for and collecting dinosaurs and other vertebrate fossils. His contribution to the discovery of the oldest known dinosaur nesting site is the latest in a series of notable findings. At the ROM, the most visible evidence of his work is the *Barosaurus* he uncovered in the vaults, now on display on the second floor of the Michael Lee-Chin Crystal. He is lead curator for *Ultimate Dinosaurs*.

Hernán López-Fernández
ASSOCIATE CURATOR

An associate curator in the ROM's Ichthyology section, Hernán López-Fernández ("The Found Fishes of the Lost World") studies the evolutionary biology of South and Central American cichlid fishes. His fascination with fish began at an early age when his father bought him an aquarium. A few years later, the budding scientist discovered cichlids and decided to dedicate his career to their study. The freshwaters of South and Central America are estimated to harbour well over 7,000 species of fishes, more than any other biogeographic region on Earth. And among that great diversity, cichlids stand out for their morphological, ecological, and behavioural diversity. Hernán's work combines field and laboratory research in systematics, biogeography, and evolutionary biology in an effort to understand the origin of the most diverse freshwater fish fauna on the planet.



Peter L. Storck
SENIOR CURATOR EMERITUS

Peter L. Storck ("The Threads That Bind") became interested in what his DNA might reveal about his ancestry while searching for his own origins—quite a departure from his ROM work as an archaeologist. The story in *ROM* magazine is part of an unpublished autobiography and family history entitled *Conversations with the Dead*, a work of creative non-fiction. While the facts in that work, as in this essay, are as accurate as possible, the opportunity to speak again with a lost family, even if only in his imagination, was irresistible. Since retiring in 1996, Peter has continued teaching and consulting with colleagues on research. He has also lectured widely to the general public on archaeological and environmental issues and, in 2008, produced a special exhibition, now travelling, for a regional museum on climate change and global warming.

Photo: Adrienne Desjardine by Wanda Dobrowlanski

Afterimage: Tod Ainslie's Vision of the War of 1812

On the conflict's bicentennial, the architecture of the War of 1812 is showcased in these evocative 21st-century photographs. *Afterimage*, displayed from June 2, 2012, to February 24, 2013, in the ROM's Wilson Canadian Heritage Exhibition Room, Sigmund Samuel Gallery of Canada, documents many of the war's historically significant sites. Between 2001 and 2009, Burlington-based Tod Ainslie used three different pinhole cameras that he designed and built himself. "As I worked with these primitive cameras and saw the images they produced, " says Ainslie, "I felt a strong sense of the period's aura, a sense of the places themselves, and an empathy for the people whose energies created them."

The war began when the United States of America, unhappy with imposed trade sanctions, declared war on Britain on June 18, 1812. For the next two-and-a-half years, army regulars, the local militia, and First Nations warriors engaged in fierce battle throughout eastern North America. When peace was proclaimed on February 18, 1815, the geopolitical landscape was restored to its pre-war state.

Past meets future as condo towers arise south of Toronto's Old Fort York.

A Letter from Our Director and CEO

The Family Museum

Through the spring of this year, we have been delighted with the success of the ROM's family programming and the extent to which families have embraced it. March Break attracted nearly 55,000 visitors, a 12 percent increase over the previous year.

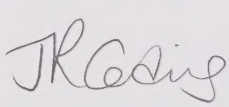
Our programs have been as varied as our collections. At ROMKids weekends, children have met paleontologists, decoded ancient Egyptian hieroglyphic messages, celebrated Earth Weekend with us, and on Space Weekend held chunks of the moon and Mars in their hands. At ROM Saturday Morning Club, they challenged the Minotaur's Maze, painted masterpieces, built empires, and explored microscopic DNA, chemistry, physics, and meteorology.

ROM Sleepovers have been especially popular as young ROM aficionados discover the Museum by night. Other programs in high demand include ROM Summer Club, a success for more than 60 years, and programs for children up to four years of age. The New to Canada Youth Club (ages 13–16) offers eight Saturday afternoons that celebrate the Canadian cultural mosaic and provide an opportunity to practice English language skills in an international environment. The ROM Explorers Club (ages 4–11), available only to ROM Members, is the ultimate club for young museum goers.

The great family experience this summer is the ROM blockbuster exhibition *Ultimate Dinosaurs: Giants from Gondwana,* opening June 23. By about 150 million years ago, the world supercontinent of Pangaea had split into Laurasia (northern hemisphere) and Gondwana (southern hemisphere). On their separate landmasses, dinosaurs evolved differently. Although *Tyrannosaurus rex* dominated northern latitudes, the even larger *Giganotosaurus* ruled the south. This colossus and other wonderfully unfamiliar prehistoric beasts from Gondwana will be unveiled at the ROM this summer as the Museum premieres this astonishing show. The interactive storytelling includes innovative iPad stations where dinosaurs are brought to life through Augmented Reality (AR). Grandparents take note—our new Senior Family membership admits the primary cardholder (age 65 or over) plus one adult and four children ages 17 or under.

A museum for all ages, we are always looking to create new events that cater to our audiences, and our Friday Nights Live @ROM (April 20 to June 22) are proving hugely popular with young Torontonians looking to party in spectacular surroundings and explore the galleries opened specially for them. Friday night revellers dance to the city's hottest DJs, presented by ElectriCity, and experience live performances, art installations, and late-night Museum talks by local artists, collectives, designers, and curators, with weekly themes ranging from fashion to music to photography, and more. And it's affordable—$9 cover per person. Artisanal wines, beers, cocktails, and tantalizing fare begin at $5. In view of the event's success, the party may be back in September. Watch for details.

As we continue to expand our attractions, we look forward to welcoming more and more individuals and families into the ROM family, as Members, and as frequent visitors to this unique social destination.



JANET CARDING
DIRECTOR AND CEO

Photo: George Whiteside

ROM Royal Ontario Museum

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Exhibitions and gallery openings

The southern-hemisphere dinosaur *Giganotosaurus*.

In the Spotlight

June 23, 2012, to January 6, 2013
ROM Original Feature Exhibition
Garfield Weston Exhibition Hall, Michael Lee-Chin Crystal, Level B2

NEW Ultimate Dinosaurs: Giants from Gondwana

Remarkable new paleontology research from South America, Africa, and Madagascar in recent years has revealed these locations as home to some of the world's largest and most bizarre-looking dinosaurs. Completely unlike North America's fauna, these southern species—and the latest scientific findings on them—will be featured in a new exhibition curated, designed, and produced by the ROM. A highlight is the world debut of *Futalognkosaurus*, which, at 110 feet in length and weighing as much as 10 elephants, was one of the largest animals to ever have walked the Earth.

Real fossils, skeletons, and 17 full-scale skeletal casts represent other dinosaurs, such as the massive *Giganotosaurus*, the crocodile-faced *Suchomimus*, and the horned meat-eater *Carnotaurus*. The show also features three Augmented Reality experiences that will bring these incredible animals to life.

Presented by RAYMOND JAMES®

Until July 2, 2012 ROM Original Exhibition
Hilary and Galen Weston Wing, Level 2

ELEGY: Deborah Samuel

For most of her life, Canadian photo-based artist Deborah Samuel has been fascinated with animals—from their physical attributes to their various roles within the natural world. In ELEGY, Samuel illustrates how a creature's rigid bones or shell continue to suggest its vanished outer form long after flesh and spirit have moved on. These 33 photographs, 10 of which feature ROM specimens, were achieved by placing specimens directly onto a flatbed scanner, transforming basic documentation into poetic imagery. The work is a testament to life's fragility, transience, and persistence.

ELEGY: Deborah Samuel is co-presented by the Life in Crisis: Schad Gallery of Biodiversity and the Institute for Contemporary Culture at the ROM.

CONTACT is supported by the Canada Council for the Arts, Celebrate Ontario, and the Ontario Arts Council.

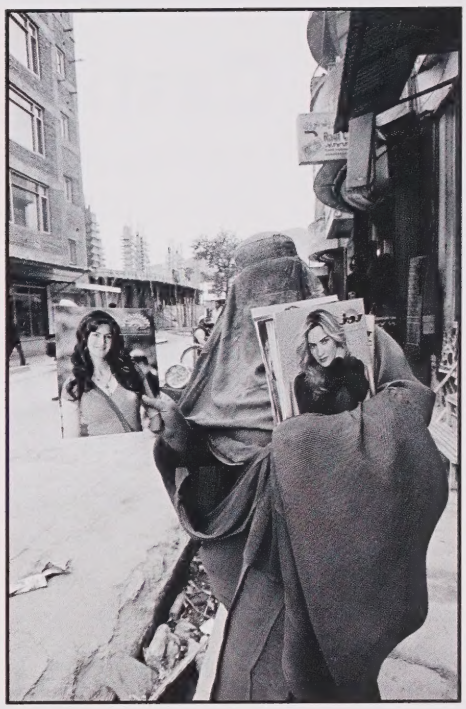
LIZARD I, 2011. Deborah Samuel.

During ELEGY's engagement, search for hidden treasures with the ELEGY Tour on SCVNGR, which can be played on your mobile device during a ROM visit. Earn points, unlock badges, and win rewards toward prizes. For details, visit **rom.on.ca/scvngr/**

Photos: Lizard © Deborah Samuel. *Giganotosaurus*: Julius T. Csotonyi. © 2011 Royal Ontario Museum.

Until July 8, 2012 **Ongoing Exhibition**
Roloff Beny Gallery, Michael Lee-Chin Crystal, Level 4

Larry Towell, Donovan Wylie: Afghanistan



Woman selling glamour magazines, Kabul, Afghanistan, 2010, photographed by Larry Towell.

Recent works by two acclaimed Magnum photographers are brought together in this exhibition that explores the ongoing armed conflict in Afghanistan. Canadian artist Larry Towell's gritty, intimate black-and-white photographs reveal the devastating effects of the war on citizens, soldiers, and the urban and rural landscapes. British artist Donovan Wylie's large-scale colour photographs of military architecture and vast empty landscapes were taken while he was embedded with Canadian peacekeeping forces in Kandahar Province. Together, these dramatic images speak volumes about the troubling social and political realities of present-day Afghanistan.

Afghanistan is a Primary Exhibition of the Scotiabank CONTACT Photography Festival. Larry Towell's photographs are presented with the cooperation of Museum London (London, Ontario), Stephen Bulger Gallery (Toronto), and Magnum Photos. The artist gratefully acknowledges the assistance of the Canada Council. Donovan Wylie's photographic series Outposts is presented with the cooperation of the National Media Museum (Bradford, UK) in partnership with the Imperial War Museum (London, UK).

The photographs were produced through the Bradford Fellowship Award, a partnership between the University of Bradford, Bradford College, and the National Media Museum.

CONTACT is supported by the Canada Council for the Arts, Celebrate Ontario, and the Ontario Arts Council.

Back view of beaded wool vest attributed to Anishinaabe Chief Wabachechake, c. 1812.

Opens July 14, 2012
Opening Exhibition
NEW
Daphne Cockwell Gallery of Canada: First Peoples, Hilary and Galen Weston Wing, Level 1

Sovereign Allies / Living Cultures

This exhibition in the Great Lakes section of the gallery explores themes related to the historical role of First Nations in wars between Britain and the United States, including the War of 1812, and to the continued vitality of First Nations cultures in the region today.

Until September 3, 2012
Rotating Exhibition
Middle East/South Asia Special Exhibitions Showcase, Michael Lee-Chin Crystal, Level 3

Shahnama: The Persian Book of Kings

A thousand years ago, Persian poet Abu'l-Qasim Firdausi penned this epic story of the kingdom of Iran, from the myths of its earliest times to the historical Arab conquest in the 7th century. For hundreds of years Firdausi's verses served as a mirror for self-reflection and inspiration for the ruling elite in Iran and beyond. This exhibition gathers *Shahnama* illustrations from Iran, Turkey, Central Asia, and Mughal India dating from the 14th to the 17th century.

Miniature from the Great Mongol *Shahnama*, c. 1330.

Opens August 11, 2012 **Coming Soon**
Roloff Beny Gallery, Michael Lee-Chin Crystal, Level 4

COMING SOON

Observance and Memorial: Photographs from S-21, Cambodia

The ICC presents an important exhibition of about 100 portraits taken at the notorious S-21 secret prison in Cambodia during the Khmer Rouge regime (1975 to 1979). The prints, made from original negatives, are presented with the historical context critical to understanding them as artifacts of genocide, not simply as compelling photographs.

The exhibition raises profound questions about the instability of civil society, mass killings, the destruction of heritage and culture, and memory, as well as responses to genocide by legal and spiritual institutions. Viewers may react with powerful emotions; a space for reflection is integral to the exhibition.

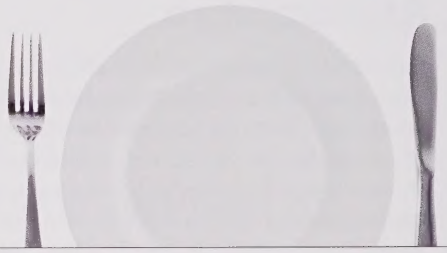
A wide range of public lectures, films, and performances will be presented in concert with the show. For details, go to **rom.on.ca/programs.**

Photos: Afghanistan © Larry Towell / Magnum Photos. Vest: ROM 911.3.123. Miniature: Rare Books and Special Collections, McGill University Library, Montreal.

Casting a Deep Net

Unprecedented underwater discoveries only reinforce the importance of conserving life in our lakes and seas

BY JAMES CHATTO



Back in the 1980s, when the winters were much colder than they are now, my son and I sometimes went ice fishing. Cramped in a tiny hut, far from shore on a frozen Muskoka lake, we would pass the time speculating about what terrors could be lurking in the deep black water beneath us and what slimy, whip-tentacled, boy-eating kraken we might drag up through the hole in the ice when our bait was finally taken. In fact, all we ever caught were splake—a hybrid of speckled and lake trout with which our particular lake was artificially stocked: perfectly good for a shore lunch but a tad disappointing from the monster-hunting perspective.

This year, the world's ultimate ice-fishing expedition will reach a long-anticipated climax as Russian scientists finish drilling down through 4 km of Antarctic ice and reach the liquid waters of Lake Vostok. Smothered by glaciers around 15 million years ago, it covers roughly the same area as Lake Ontario but its volume is three times as great. Geothermal influences and the immense pressure of the ice above it keep the water from freezing. While there certainly won't be any trout down there, biologists hope to find microbial organisms unlike anything else on Earth.

There's a special fascination about discovering nondescript forms of life—an echo of the wonder Adam must have felt as he thought up names for the creatures in the first garden. It shines through in the words of ROM ichthyologist Hernán López-Fernández's article in this very magazine as he introduces the unique cichlids he's discovered in remotest Guyana. But how horribly ironic that these new-found fish are in imminent danger of extinction due to extensive gold mining in the area. It's a game humans have played forever—a race to see if we can discover new species faster than we can exterminate the old ones. With one hand we celebrate biodiversity; with the other we eliminate it.

Of course, humans are also responsible for the splake in our old Muskoka lake. I'm not sure if creating new hybrid species is a bonus in terms of biodiversity or if it's cheating. Splake fans sometimes claim that the fish fill a niche where their natural forebears find it more difficult to thrive. They also give anglers good sport, helpfully diverting fishermen from dwindling stocks of lake and speckled trout. And, contrary to some reports, they taste very good when filleted and deep-fried in panko crumbs, pepper, and salt. The main argument in their favour is that they rarely if ever reproduce in the wild (though they do so in hatcheries), which means they are manageable rather than invasive.

On the other hand, when mature, they do eat other fish, including wild trout. That may account for their popular nickname, Wendigo, after the supernatural cannibalistic demon of the Algonquin Indians. I guess our long-ago ice-fishing expeditions were more successful than they seemed: we were catching monsters after all. ○

JAMES CHATTO is a Toronto-based food writer and the editor of *harry* magazine.

ROM MEMBERS ROM Members receive a 10% discount in c5 Restaurant Lounge and Food Studio.

Photo: courtesy Stephen Molson

Without a Trace

The case for looking forward

BY MARK KINGWELL

The human desire to trace one's ancestry is not, contrary to received wisdom, universal. I, for one, don't share it. Naturally I blame my father for this. When he decided to join the Royal Canadian Air Force in his 20s, he launched our family on an itinerant existence that involved facing a new town, school, and neighbourhood every three years.

A rootless childhood like this tends to make you live in the moment. Your BFF is anyone playing the current game of kick-the-can or road hockey. The back seat of the family car grows more memorable than any room. The only vestige of stability is itself simulacral: the permanent married quarters on all Canadian air force bases—PMQs—were built using just a few different designs. Thus it was possible to move from Nova Scotia to Manitoba and still have the same kitchen. Reading Ann-Marie MacDonald's 2003 novel set on a RCAF station, *The Way the Crow Flies*, I had the peculiar creepy comfort of seeing the exact layout of my 1970s Prince Edward Island home described as part of 1960s Ontario.

Anyway, I guess this is why those television ads for Internet family-tree searches strike me as goofy. I find myself more interested in living Kingwells than dead ones. Am I, for example, related to any or all of Rob Kingwell (Canadian snowboarder), Colin Kingwell (English jazzman), or Leanne Kingwell (Australian rock-and-roller)? If so, can I please have some comp tickets for a show or competition?

The little booths at airports and trade shows, meanwhile, that offer to sell you a wooden plaque or parchment festooned with your family's authentic coat-of-arms seem just a step away from carnival barking or fortune-telling. As if there were untapped aristocratic blood flowing in even the most banal family!

In fact, of course, there is. Mathematics and human biology together demand that we are all descended from a relatively small pool of ancestors. But the numbers are more surprising than most people imagine. For instance, every European alive today, save recent immigrants, has a common ancestor who lived as recently as 1400, while all 8 billion people on the planet have a common ancestor who dates from the first century of the Common Era. Every European is related to Muhammad, and every living North American is descended from English royalty—even, because of intermarriage, African-Americans and members of First Nations.

Or consider that celebrated American case of status-seeking, those who claim descent from the pilgrims and sailors who endured the 1620 *Mayflower* crossing to Plymouth, Massachusetts. Yes, eight U.S. presidents came from this pool, but so did literally millions of people alive today, including Hugh Hefner, Alec Baldwin, and Sarah Palin. Genealogy is not the same as a social network, whereby we are all connected within the celebrated six degrees of separation (or Kevin Bacon); still, it takes no more than 25 to 30 generations to link everyone to everyone else in the human family.

To be sure, mathematics and biology also demand that every line in that massively complex chain is unique. That is presumably the real root of our root-seeking. Most of us do not use heraldic quarterings to connect powerful families or land holdings, but people still like the idea of a narrative that links them to the past. It makes existence seem less random—even though that randomness is precisely highlighted by the contingent connections of marriage, birth, and death.

There is a complicated lesson here, and not just about family. Those who once lived and those not yet born share the same political disadvantage: they are blocked from what G. K. Chesterton called the "small and arrogant oligarchy of those who merely happen to be walking about." Celebrating the past is easier than imagining the future, and yet our obligations to future generations are the more urgent, and they can't be met with a solemn ceremony or a celebratory firecracker—or a family tree. I mean wise stewardship of the environment, bequest of healthy political institutions, and maintaining the essential public trusts of art, science, and knowledge.

As Kierkegaard said, life can only be understood backwards; the trouble is, it must be lived forwards. Tracing ancestry must be the beginning, not the end, of human responsibility. o

MARK KINGWELL is a professor of philosophy at the University of Toronto; a new collection of his essays, *Unruly Voices*, will be published this fall.

Illustration: Claire Louise Milne

Discoveries, Dispatches, and Discourse

An example of a Victorian natural history travel journal, this one written and illustrated by Charles Horne during his tenure in India.

Passage from India

The jottings of Charles Horne

The journals and field notes of natural historians are important sources of original scientific data from past eras—and often are illustrated with beautiful drawings. The ROM's archives hold an extensive collection of these documents from the 19th and early 20th centuries. One of the prizes of the collection is the exquisitely illustrated journal of Charles Horne, fellow of the Zoological Society of London, from his time in the Bengal civil service when he lived at Burdwan (present-day Barddhaman).

Covering the period 1834 to 1847, the journal documents the natural history of India, especially the Landour region within the Lower Western Himalaya near Dehradun. Horne's observations included botanical specimens, insects, birds, and this wonderful image from the class Reptilia, which he identified as an agama. This journal entry is dated June 3, 1844, at Madrapore (present day Vasai). Horne returned to England in the early 1860s. Unfortunately, during the Indian Rebellion of 1857 he had lost most of the field notes and collections he'd made over a 16-year period, making the ROM's surviving journal a unique treasure.

The journal came to the Royal Ontario Museum of Zoology as a gift from the family of Scottish zoologist Adam White (1817–1879), who worked in the Zoology Department of the British Museum until 1863. Both avid entomologists, White and Horne would have known each other in the early 1860s, but it is not known how White came into possession of the journal.

ARTHUR SMITH is head of the Library and Archives at the Royal Ontario Museum.

News

ROM Scientists Help Identify Two More Dinosaur Species

ROM paleontologist David Evans and Michael Ryan of The Cleveland Museum of Natural History have recently identified two new species of horned dinosaur—*Unescoceratops koppelhusae* and *Gryphoceratops morrisoni*. Both species, herbivores that lived during the Late Cretaceous period, 75 to 83 million years ago, are described in research published in the June 2012 issue of the journal *Cretaceous Research*.

The study's authors—one of whom is Caleb Brown, a PhD candidate supervised by Evans—believe that *Gryphoceratops* measured less than 2 metres in length as an adult, making it the smallest horned dinosaur in North America. The jaw fragments of this specimen were discovered on a ROM expedition in 1950, and recently identified in the ROM collection by Evans. The species name "morrisoni" honours ROM technician Ian Morrison, who discovered how the bones fit together, which ultimately led to this dinosaur's recognition as a distinct species.

Unescoceratops koppelhusae (at right) and *Gryphoceratops morrisoni* were only about the size of a German shepherd.

The slightly larger *Unescoceratops koppelhusae*, which measured about 2 metres in length, had a distinctive hatchet-shaped jaw. It was discovered in 1995 by Philip Currie, now with the University of Alberta, and was originally referred to as *Leptoceratops*. New research by Ryan, Evans, and their team has determined that the specimen in fact represents a new genus and species.

The two new dinosaurs fill in significant gaps in the North American fossil record of this group of small horned dinosaurs.

Dinosaur illustration © Julius T. Csotonyi

See page 30 for more on the latest work of David Evans and Ian Morrison.

News

The Year of Marine Biodiversity at the ROM

In collaboration with the Montreal-based Secretariat for the Convention on Biological Diversity (CBD) and the UN Environment Programme, the United Nations General Assembly has declared 2010–2020 the "Decade on Biodiversity" with the goal of raising international awareness of plants and animals and the role that nature plays in our lives. The decade started with an emphasis on general biodiversity (2010), and has since focused on thematic taxa or ecosystems. The year 2012 is dedicated to "oceans."

This year, the ROM, through its Life in Crisis: Schad Gallery of Biodiversity, has partnered with the CBD and the UN as one of many regional centres for action. To date, Museum staff have conducted fun, interactive audience research workshops on the state of our oceans with Dodo Lab, developed an "Ocean Curriculum Package" for Ontario elementary and secondary school teachers, and partnered with WWF-Canada on the *Canada's Oceans & You* exhibit, presented by Loblaw Companies Limited, at the 2012 Green Living Show.

Ocean programs continue through the summer with a celebration of World Oceans Day on June 8. The eco-adventurers and famed Canadian duo The Water Brothers will be on hand in the Earth Rangers Studio sharing stories of their world travel experiences and discussing our relationship with water. Later the same day, the award-winning Canadian documentary producer Rob Stewart (*Sharkwater*) will provide an interactive and inspiring talk about his upcoming film *Revolution*, set to launch at TIFF in fall 2012. And ongoing in-gallery animators, facilitators, and curatorial staff remain ready to answer your questions about our oceans.

DAVE IRELAND is managing director of Biodiversity Programs in the ROM's Life in Crisis: Schad Gallery of Biodiversity.

United Nations Decade on Biodiversity

Photos: Contest winner by Amber Richmond Photography. Sculpture ROM 999.1271. Reef: Fotosearch Stock Photography

Curator Favourites

ROM magazine asks curatorial staff to share their favourite objects from the ROM's collections.

Trudy Nicks
Senior curator, Anthropology section of the ROM's Department of World Cultures

Recycled Identity

A modern sculpture that trashes the stereotype

Favourite object: *21st Century* (mixed media), 1999, by Christopher Wabie, Algonquin, Tamiskaming First Nation. 132 x 79 cm.

The form and the materials of this sculpture are strangely familiar, but do they belong together? Algonquin artist Christopher Wabie created this fantastic headdress while a student at the White Mountain Academy of the Arts at Elliot Lake in northern Ontario. The artist has substituted old refrigerator coils and bits of wire and plastic for the eagle feathers, ermine skins, and beads traditionally used to make a flowing feather bonnet.

The feather bonnet originated among Native peoples of the Plains, but by the late 19th century it had become the iconic image for all North American indigenous peoples. The stereotype persists to this day, and is often used as a personal or political marker of Native identity. In his choice of form and materials, Wabie explores how the detritus of modern industrial society can be employed in an ironic yet powerful expression of this stereotype.

Why she chose it: This sculpture is a favourite because it challenges us to reflect on how First Nations have established their own space and identity in the contemporary world.

And the winner is:

Alexander Muth, age 11

Congratulations, Alexander! This grade 5 student from Guelph, Ontario, was one of more than 2,300 kids from across Canada who played the "Find the Baby Bison" contest, which ended February 25, 2012. Alexander was the lucky randomly chosen winner of the Grand Prize: a trip for his family to Grasslands National Park in Saskatchewan! He will be going with his dad and two siblings in August 2012.

Alexander with his dad and the ROM's Dave Ireland.

A long-time ROM lover and natural history enthusiast, Alexander coincidentally chose Saskatchewan as his topic for a recent class project.

At Grasslands National Park, the family will assist park biologists in monitoring the recently re-introduced black-footed ferret, hike through rattlesnake territory, and see free-ranging plains bison roaming the open prairie.

BISON Collaborative

ICC
In Conversation

Dr. Carla Shapiro, a research fellow at U of T's Munk School of Global Affairs, speaks with Francisco Alvarez, managing director of the ROM's Institute for Contemporary Culture, about the upcoming ICC exhibition *Observance and Memorial: Photographs from S-21, Cambodia*. This important exhibition presents a rare archive of photographs found at the S-21 prison run by the notorious Khmer Rouge (the Communist Party of Cambodia, which ruled the country from 1975 to 1979) and provides the historical context on events that led to the archive's creation.

Francisco Alvarez: The mass murders that occurred in Cambodia under the Khmer Rouge regime are not well known by Canadians. Why is that?

Carla Shapiro: In the 1970s, the Vietnam War, known in Vietnam as the American War, dominated the news, and by the time the Khmer Rouge (KR) took power in Cambodia there was a certain fatigue for news of war and conflict coming from Southeast Asia. Of course, this was greatly compounded by the fact that the KR was a very secretive regime and tightly controlled any information coming out of Cambodia. The capacity of Western journalists to cover Democratic Kampuchea (as Cambodia was renamed after the KR takeover) was highly restricted; those who stayed did so at their own risk. Dozens of journalists were killed or went missing in their attempts to report on what was taking place. As in most regimes involved in mass murder, such activities were kept hidden—this secrecy was a legacy that continued in the post–KR period and, to a certain extent, contributed to this dearth of knowledge in the West about the KR era.

Many countries in the West actively supported the Khmer Rouge for years after they were removed from power, and even after the atrocities were well known; as such, this non-celebratory chapter in our history has been left mostly unexplored. In the immediate post–Khmer Rouge era, Cambodia itself attempted to bury its past in the interest of rebuilding a society beset by division. It is only recently, with the trials at the Extraordinary Chambers in the Courts of Cambodia (or ECCC, commonly referred to as The Khmer Rouge Tribunal), that both domestic and international interest has been re-focused on the crimes that took place under the Khmer Rouge. It is also worth noting that the atrocities took place decades ago in a country in Southeast Asia that few Canadians know much about. As Bosnia, Rwanda, Darfur, Kosovo, and now Syria have each, in their time, moved to the forefront of media attention for gross human rights violations, Cambodia has, most often, been relegated to a distant, if not almost forgotten, past.

FA: What is S-21 and why were these extraordinary documentary photographs of the prisoners created?

CS: S-21 was the largest and most notorious of the 197 prisons set up throughout Cambodia during the Khmer Rouge regime. S-21 is more accurately described as an interrogation and torture centre rather than a prison, as more than 14,000 prisoners were sent to S-21, but by the time the Vietnamese military entered Phnom Penh in January 1979 only 12 survived. The KR regime began to falter soon after taking power. The agrarian utopia that Pol Pot and the other KR leaders envisioned failed to produce the necessary amount of food needed to sustain the populace. Rather than look to their own misguided policies, leaders blamed internal and external enemies. The regime became increasingly suspicious and more and more people were accused of being enemies of the state—even high-ranking cadres in the Khmer Rouge. Special prisons such as S-21 were required to handle and "process" such "valuable" prisoners. "Process" refers here to systematic torture and execution. Prisoners were forced to confess to crimes they were suspected of committing and to implicate others in a larger conspiracy. Soon after arriving at S-21, prisoners, sometimes accompanied by their spouses and children, were photographed. There was a specific documentary unit at S-21 whose job it was to take "portraits" of all incoming prisoners. Each photograph was attached to the prisoner's "confession" file, which contained a detailed biography and transcripts of information extracted under torture. The photographs were used as a means of correctly matching the prisoners being interrogated with their file. In some cases, such as for high-ranking military officers, post-mortem photographs were also attached to the confession file, and the completed file forwarded to the KR leadership as evidence that the mission had been completed. After "confessions" were extracted, prisoners who did not die during the interrogation process were executed in the killing fields of Choeung Ek, a few kilometres from S-21.

Of the 6,000 extant prisoner photographs, 105 will be shown in *Observance and Memorial*.

Photos: Courtesy Photo Archive Group

"The portraits are being shown at the ROM as witnesses to the atrocities that took place during the Khmer Rouge regime and to bring awareness to the public about this period in our world's history."

Far left and left S-21 prisoners identities unknown

FA: What else will people learn in the exhibition?

CS: The exhibition will describe the rise of the KR in the context of colonialism, civil war, and the ongoing conflict in neighbouring Vietnam. It will endeavour to explain the ideology behind the KR—what exactly they were trying to achieve but which ultimately led to the deaths of nearly 2 million people, more than one-quarter of the population. The exhibit will also explain why security centres such as S-21 were set up. Importantly, *Observance and Memorial* will name and provide biographical information about several of the individuals pictured in the exhibition. While most victims of S-21 remain anonymous, several have been identified by surviving family members, friends, and acquaintances. As well as sensitively memorializing the lives lost, learning something of the lives that were extinguished as a result of KR policies is a key part of the exhibition. Reflecting on individuals caught up in the destruction brought on by the KR state leads exhibition visitors to ask their own questions—about the nature of violence, about the capacity of humans to be harnessed to commit genocide, and about political activism when gross human rights violations are taking place. What might be done while thousands, if not millions, perish? This is a question as relevant today as it was in 1970s Southeast Asia. The exhibition implicitly asks its visitors these difficult questions.

FA: The S-21 photographs are intended to be seen as documentary evidence of crimes against humanity, not as fine art portraiture. Why is this distinction important?

CS: The victims pictured were caught at a moment of terror, heading to a fate unknown but sensing peril ahead. The photographs were taken to document a process of torture and murder. They were never intended to be displayed on gallery walls. However, in their "afterlife" they hold great educational potential. The portraits are being shown at the Royal Ontario Museum as witnesses to the atrocities that took place during the KR regime and to bring awareness to the public about this period in our world's history, which few, here in Canada, know took place.

The fact that there is artistic merit in the photographs (the lead photographer, Nhem En, was a trained photographer) creates a tension between their documentary function, as evidence of the crimes committed, and a certain aesthetic engagement, and it is this tension, which cannot be denied, that makes this exhibition so compelling and helps raise these necessary questions.

FA: The second round of war crimes trials against former Khmer Rouge leaders is currently under way and garnering international news coverage. How else are Cambodians recovering from the trauma of the events of the Khmer Rouge period?

CS: The scale and level of destruction that took place make coming to terms with the past extremely difficult—decades, even generations of time will be required. Unlike the genocide of the Jews that took place during Nazi Germany or the genocide in Rwanda where Hutus killed Tutsis en masse, the atrocities committed under the Khmer Rouge regime were inflicted by Cambodians upon other Cambodians—and thus recovery from the trauma involves an even more complex psychological dynamic. Cambodia's history of unaddressed human rights violations has been divisive. It has left a legacy of trauma, and has stifled the country's development—psychologically, politically, and economically. The criminal prosecution of senior leaders of the Khmer Rouge via the ECCC is necessary to address the culture of impunity that had been the norm in post–Khmer Rouge Cambodia. Trials, and their enshrined notions of accountability, are essential in the search for truth and justice. The first trial to take place at the ECCC was for the chief of the S-21 prison—Kaing Guek Eav, also known as Duch. Trials offer some measure of justice for the victims of the Khmer Rouge; however, there are other paths that help individual survivors and the country as a whole address the trauma that took place. Museums that provide venues for exhibitions about the history of Democratic Kampuchea, both in Cambodia and internationally, serve such a purpose—by providing another critical forum for dialogue and mourning.

DR. SHAPIRO is associate curator of *Observance and Memorial: Photographs from S-21, Cambodia*, and a researcher at the Asian Institute, Munk School of Global Affairs, at the University of Toronto. The exhibition runs from August 11, 2012, to March 17, 2013.

Article of Faith?

The embellishment on this unprovenanced ring could reveal its history

BY ADRIENNE DESJARDINE

This Jesuit ring from the ROM's New World Archaeology collections shows the "L-Heart" stylistic variation.

In 1966, a donation of Ontario archaeological material was deposited at the ROM with nothing more than the donor's surname and address. Presumably it was a busy time: Walter Kenyon, then staff archaeologist, summarily identified the donation as adequately significant to secure for the Museum and then had it packed and set aside for future examination. The box remained sealed for the next 45 years.

Recently, while investigating a research request, I pulled down the cardboard box from a rack of excavated material and opened it. I was dazzled by the contents. It would be misleading to call it a treasure trove, but lying atop a jumble of nondescript ceramic sherds lay a veritable "diamond in the rough"—a Jesuit ring. Archaeological collections with no provenance are typically not accepted by the Museum as they lack the context derived only from careful excavation. Kenyon clearly saw the ring as an exception to the rule.

Perhaps that's because archaeologists had begun to consider that Jesuit rings could potentially identify site dates and locations because of their stylistic variation and their methodical dispersal among Huron-Ouendat (Wendat) villages in the early 17th century. The iconographic engraved or "cast-stamped" designs might allow archaeologists to associate these rings with particular sites, despite a lack of archaeological provenance. With its immediately recognizable "L-Heart" embellishment, this ring is no exception. The large letter "L" to the left of the heart is thought to refer to Ignatius of Loyola (1491–1556), founder of the Jesuit order, or possibly, in combination with the heart, to stand for *L'amour*. L-Heart, or "friendship," rings are found almost exclusively on pre-1650 sites, and in Ontario, primarily in the Huronia area. With further investigation, it might even be possible to propose a site designation for the ring.

The L-Heart is but one stylistic variation of many, ranging from secular to religious, on Jesuit rings made of a copper casting alloy known as "gunmetal" (which contains zinc, tin, and lead). Now heavily patinated and tarnished, the rings would once have glowed. Manufactured in Paris, France, then exported from La Rochelle to the New World, these "trinkets" fit the needs and desires of multiple players, both European and First Peoples. Interpreted as rewards given to converts for learning the catechism and pledging faith to the Christian doctrine, the rings clearly functioned for the French as a cheap and readily available stream of gifts given to ease relations and stimulate reciprocity.

Interpreting how First Peoples valued and used the rings is a more enigmatic pursuit. Though rarely recovered in their original place of deposition, when found in archaeological context Jesuit rings typically occur en masse: strung as necklaces, amassed in bags, attached to clothes as "tinkling cones," and sometimes stacked on adults' fingers. This massing suggests that the rings were worn not as adornment, but perhaps as an ostentatious or affectionate offering to accompany the departed.

As chronological and geographic indicators, such rings can enhance our understanding of a complex history. What Kenyon recognized 45 years ago still holds true: exploring the multifaceted meanings of Jesuit rings and how they fit into a broader ethnohistorical context has compelling possibilities. o

ADRIENNE DESJARDINE is a collections technician in the New World Archaeology section of the ROM's Department of World Cultures.

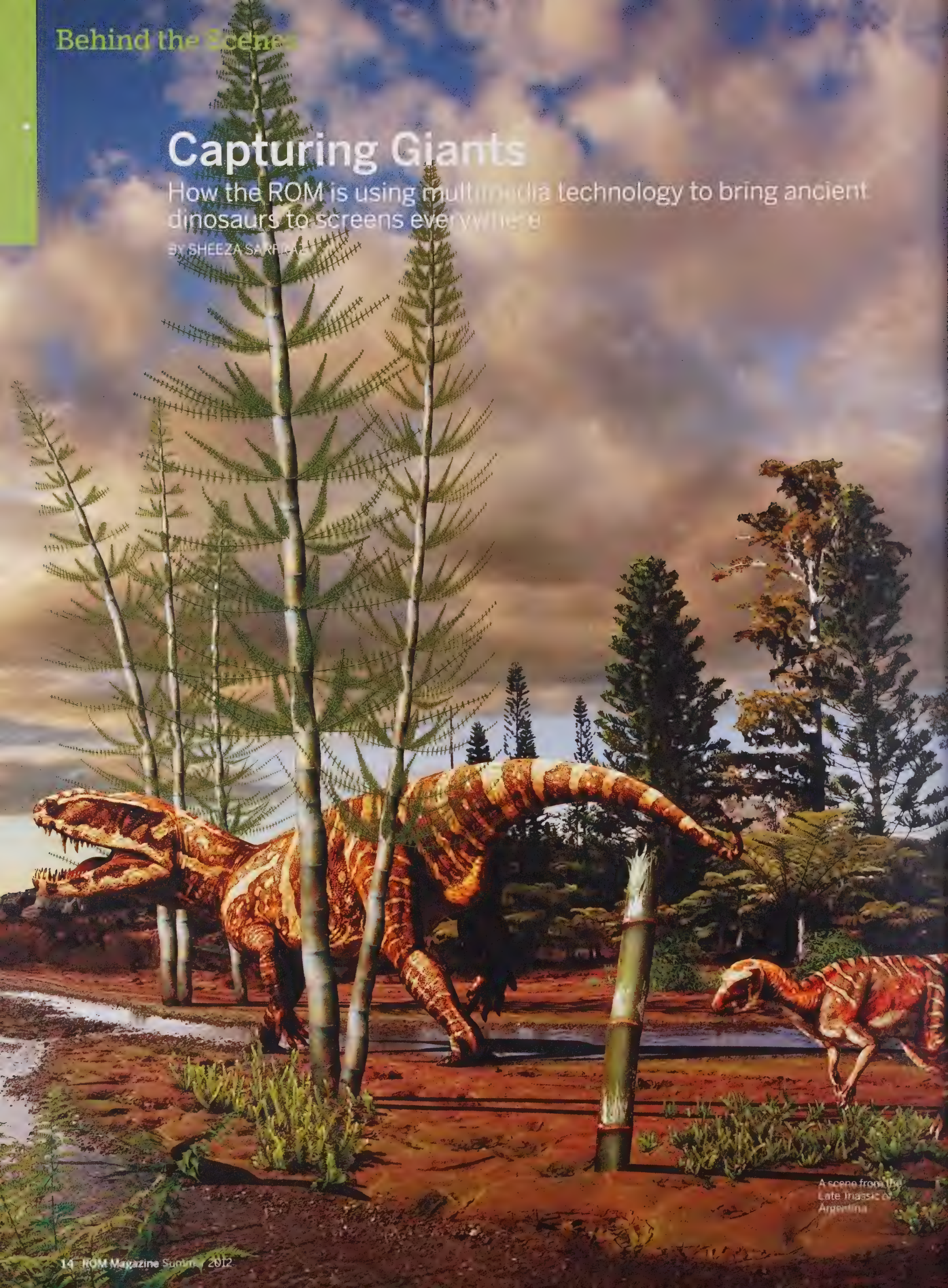
A lack of realities from Jesuit records precludes our knowing exactly how the Huron used the rings as embellishments. This contemporary artistic interpretation illustrates how the rings may have been used.

Illustration ANNA + ELINA + BAYBLESS

Capturing Giants

How the ROM is using multimedia technology to bring ancient dinosaurs to screens everywhere

BY SHEEZA SARFARAZ



A scene from the Late Triassic of Argentina

Conjuring extinct creatures into existence, the likes of which have never been seen, is challenging. But as the ROM prepares to take visitors millions of years back in time to the supercontinent of Gondwana, we are doing just that.

Ultimate Dinosaurs: Giants from Gondwana focuses on the dinosaurs down under—those that inhabited the land mass now split into South America, Africa, Antarctica, and Madagascar. Seventeen full-skeleton casts of these southern giants have been created and will be shown alongside an array of real fossils. But in today's digital age, multimedia forms the bedrock of any representation of prehistoric life. In a post–*Jurassic Park* world, can audiovisual elements excite interest in ways that Hollywood hasn't already?

This exhibition, the first ROM-produced natural history blockbuster, will provide the answer. Quite different from what's typically seen in effects-heavy dinosaur movies and television, the ROM is using technology to immerse guests in multiple aspects of this prehistoric world. The large-scale geological processes that split the supercontinents into the ones we are familiar with today, for example, are elaborated through a participatory puzzle that allows users to re-align the drifting continents using in-house iPads and a communal screen.

To see how the animals might have looked fleshed out, complete with sound and movement, visitors can direct iPads at digital markers next to dinosaur skeletons. Geological, biological, and anatomical perspectives of the animals are shown onscreen, down to the skin and flesh that cover the bones we so strongly associate with the word "dinosaur." Motion-sensing screens allow for an interactive, and perhaps at first slightly unnerving, experience as dinosaurs react to visitors' approach with onscreen activity. Large-scale IMAX projections give a sense of the surroundings these creatures inhabited.

A human dimension, documenting how dinosaurs are discovered and studied today, is very much part of the exhibition narrative. Towards the end of March 2012, Randy Dreager and Rob McMahon, both audiovisual specialists on the ROM's Media Productions team, accompanied exhibition curator David Evans to the province of Neuquén at the northern end of Patagonia in Argentina to shoot on-the-ground mini-documentaries in the places where these rare dinosaur specimens were discovered.

"Videography is a way of enhancing our storytelling," explains Dreager, who is also the ROM's manager of Media Productions. "When curators go into the field, they are focused on the science. We help interpret their research and tell the stories behind it." Dreager believes integrating digital technologies into exhibits is an effective way to educate and entertain increasingly technology-savvy visitors.

This footprint belonging to *Giganotosaurus* is approximately 3 feet long.

Among the footage brought back from the badlands of Argentina are shots of a rocky landscape etched with enormous dinosaur footprints almost three feet in length belonging to *Giganotosaurus*—part of a walkway frequented by dinosaurs millions of years ago. "Going into the field to film these locations allows us to communicate to the public the idea that these specimens are from a real world that was living and vibrant," says McMahon, who directed and produced the documentaries. "Dinosaurs didn't come from outer space. They once lived in the same regions that we explore in our video."

Dr. Ariana Paulina-Carabajala, the paleontologist who as a graduate student in 2000 discovered the star of the show—the titanosaur *Futalognkosaurus* (which averaged 107 feet in length!)—was among those interviewed. She returned to the scene of her discovery to speak with the ROM team.

Filming also took place at a vineyard where workers stumbled upon important dinosaur fossils during construction of the winery. McMahon's goal with the documentaries is to have visitors feel they are part of the expedition, to convey the wonder of discovering the prehistoric world that existed where humans now dominate. Says McMahon, looking at a case of bones preserved within the winery: "You can imagine that the dinosaur died here, therefore that it also lived here."

Thanks to multimedia technology, the ROM is able to invite its audiences into the virtual Mesozoic world of these impressive southern dinosaurs. ○

SHEEZA SARFRAZ is a researcher/writer at the Royal Ontario Museum Press.

Check the fall issue of *ROM* magazine for news on how Augmented Reality is changing the way visitors experience museums

Follow David Evans as he takes readers behind the scenes during the making of *Ultimate Dinosaurs* at **blog.rom.on.ca** Map the **#ultimatedinos** adventure on twitter @ROMPalaeo and @davide_rom

Mending History

The seamless art of a textiles conservator

BY LEE-ANNE JACK

Shirley Ellis
SENIOR TEXTILE CONSERVATOR
Department of Conservation

Conservation Positions
1996–2003
Textile Conservator
University of Alberta

Education
1994–1996
Master of Art Conservation
Queen's University, Kingston, Ontario

1986–1988
Visual Communication Diploma
Grant MacEwan Community College

1983–1985
Graduate coursework towards Master of Science
University of Alberta

1977–1981
Bachelor of Education
University of Alberta

Go to rom.on.ca/media/podcasts/ to see Shirley [illegible] work on her most [illegible] project to date: a [illegible] palampore, a type of [illegible] curtain or cover made in [illegible] Antoinette.

In 6th grade, when Shirley Ellis sewed her first piece of clothing for home-ec class—a purple jumpsuit—she never expected she'd make a living from her skill with a needle and thread. Even years later, when she'd come home from a job in retail one night and sew an outfit to wear the next day, it never really crossed her mind. She had her sights set on science. Today, as the ROM's senior conservator of textiles, Ellis cares for pieces of costume and textile history—a nice blend of art and chemistry.

Since joining the ROM in 2003, Ellis has ministered to dresses from the 1700s, silk fragments, costumes from the Renaissance and medieval eras, ethnographic clothing and textiles, and textiles from South Asia and Egypt. One of her most glamorous assignments was working on a gown that may have belonged to Marie-Antoinette. But her favourite pieces, if she's pressed to choose, are needlework samplers—because of their size and potential repairs. Today, a red ensign is spread on her work table. Her challenge: to ready the War of 1812–era flag for display in the Daphne Cockwell Gallery of Canada: First Peoples.

"We're not attempting to patch it and make it look new," says the University of Alberta–trained conservator. "But you can see it's not in very good condition." Her favourite kind of project. Though she holds a Master's in art conservation from Queen's University, there's really no manual for this work, and she must devise solutions on the fly. Born in Hamilton, Ontario, Ellis, who lived for many years in Alberta, has much experience to draw from, including internships at the Cathedral Church of St. John the Divine, New York, NY, and the Institute of Nautical Archaeology, Bodrum, Turkey.

She expects the red ensign to have a satisfyingly dramatic before-and-after (watch for her article in the fall issue of *ROM*). It's a nice change, considering how much of her work isn't especially visible. The Museum's approach is low intervention, particularly with archaeological materials, where supporting the weakened fabrics simply by laying them on a rigid, padded support, is the best approach. "The fibres on this type of material are just so brittle. As soon as you start working on them, they break." Other damaged delicate fabrics, such as ribbons or shredded dress linings, can be encased in sheer polyester Stabiltex stitched down with very, very fine thread, almost like a protective fabric cage.

A typical project starts under the microscope, identifying the fibres. Ideally, you use "like with like" in choosing fabric to repair a textile. Other common activities: testing dye fastness, mixing cleaning solutions in the correct pH, and humidifying and flattening fabric to appear "pressed" without using heat.

Sometimes solutions come from teamwork. The mountmaker devised an ingenious band of magnets, invisible to viewers, to support the weight of tinkle cones along the bottom hem of an 1899 Southwestern Chippewa pow-wow tunic being exhibited with the flag.

Immersed in the world of textiles at work, Ellis now tries to avoid the siren call of fabric stores. An overflowing bin of textiles at home already calls out to be sewn into suits and special-occasion dresses. ○

[illegible] belonged to Marie-Antoinette of France

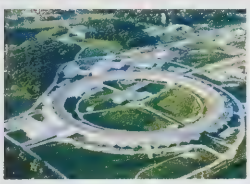
Photo: Shirley Ellis by Wanda Dobrowanski
Silk gown, ROM 925.18.3.A

Safe Storage
Shirley Ellis regularly fields calls asking for advice, most often on how to store textiles properly. Her advice: Keep fabric away from the light. Store it without folds if possible, and if not, avoid sharp folds and cushion them with acid-free tissue. Avoid storage containers that contain PVC. And keep humidity as stable as possible—attics and basements are likely not ideal storage locations.

UNITED STATES

Kim Tait
ASSOCIATE CURATOR
Mineralogy

In March, Kim Tait conducted research at the Argonne National Laboratory just outside Chicago, Illinois, using one of the world's most advanced analytical instruments, called the Advanced Photon Source, or synchrotron. One station, called HPCAT, allows scientists to study what happens to minerals at extreme conditions. When a mineral is placed between two small diamonds it is literally squeezed under pressures similar to those found deep in the Earth—places inaccessible to the direct study of minerals. The synchrotron uses high-energy photons to study the results. Understanding what happens to a mineral at extreme forces is important to understanding our planet and the formation processes of other planets in the solar system.



MANITOBA

David Rudkin
ASSISTANT CURATOR
Invertebrate Paleontology

Intriguing fossil discoveries in the 445-million-year-old (Late Ordovician) rocks in north-central Manitoba continue to be a focus of Dave Rudkin's research. This year, he returns to examine outcrops of ancient tropical seabed deposits on the Grand Rapids Uplands, where extraordinary remains of rare eurypterids ("sea scorpions"), horseshoe crabs, and other odd joint-legged animals have been uncovered. This collaborative project with The Manitoba Museum, the University of Saskatchewan, and the Geological Survey of Canada is revealing new and unexpected insights into the ecology and evolutionary dynamics of life in shallow Ordovician seas.

QUEBEC, CHILE, AND ARGENTINA

Allan Baker
SENIOR CURATOR
Ornithology

In 2011, Dr. Allan Baker led expeditions to Mingan Archipelago, Quebec (August), and Tierra del Fuego (December) as part of his long-term study of the survival, migratory strategies, and population size of the endangered red knot (*Calidris canutus*). The good news: the studies confirmed strong recruitment of young in 2011, a rare outcome in the last decade. A flock of 600 juveniles was seen in Mingan, and population counts on the Chile and Argentine sides of Tierra del Fuego showed that numbers have increased to about 13,000 from 10,000 in 2010. In March 2012, Baker travelled to Patagonia to capture samples from flocks migrating back north for use in estimating annual survival.

CAMEROON

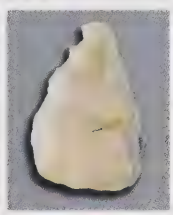
Silvia Forni
ASSOCIATE CURATOR
Anthropology

Silvia Forni continues researching the contemporary production and marketing of African art. Her trip to western Cameroon last summer focused on objects used in both daily and ritual activities and sold in centres such as Foumban and Bamenda. Forni works with both artists and dealers to examine the ways in which they collaborate and interact in determining the kind of objects that are produced and for whom. Says Forni, who plans to return to Cameroon this summer: "Indeed, beautiful things are still made in Africa daily, and traditional skills are thriving."

NORTHERN CHINA

Chen Shen
SENIOR CURATOR
Archaeology

Last summer in China, Dr. Chen Shen and his team discovered several Achechulian lithic artifacts, or stone tools, typically associated with African and European hominids of the Lower Paleolithic age. The tools they uncovered are thought to be only 1.5 million to 500,000 years old—much more recent in date than others of their kind—and are the first evidence of Achechulian industry in northern China. The ongoing project aims to answer the question of why relics of European-style hominids would appear in this part of the Old World. Shen returns to the site this year, and also continues work at the famous Peking Man site near Beijing.



Where in the world are they?

The who, what, and where from our international curatorial team

Potter displaying painted lions by Silvia Forni. Silvia Forni by Michael De Forest. Lithic artifact by Chen Shen

THE THREADS THAT BIND

An archaeologist's search for human origins in the deep past becomes surprisingly personal

BY PETER L. STORCK

Top, left: With a childhood friend on the first day of kindergarten, 1945 or 1946.

Top, right: With a VW van purchased in 1964 for Master's thesis fieldwork.

Middle: Fieldwork at the Banting site, 1973.

Bottom: Geological testing at Banting, 2004. The site has since been destroyed by urban development.

For much of my life I've lived in the past. As a child, I began collecting fossils of ancient corals several hundred million years old from an abandoned rock quarry near my home. Years later, at university, I bonded firmly to the past when I took my first course in human evolution. And after I became a curator at the ROM, I buried myself in the past for nearly three decades, searching the beginning of the archaeological record for traces of the first people to occupy Ontario at the end of the Ice Age—hunter-gatherers, called Early Paleo-Indians, who lived some 11,000 years ago.

But lately, I've been paying much more attention to the more recent past, and other origins. My own. Something I had neglected for nearly a lifetime. I wondered about the influences that shaped me: the end of WWII during my childhood, the Korean War and the Cold War during my adolescence, and the Vietnam War during my student years at university. These decades have left me with emotional scars. During that period my family declined, nearly becoming extinct because of premature deaths from cancer, heart disease, tuberculosis—deaths that denied me ongoing connections in life. I've tried to compensate for those losses by creating a family history from a scattering of surviving documents, photographs, and memory fragments withered from neglect. Little survived, and there are no elders left who can answer questions about things I experienced as a child but did not—and still do not—understand and to explain events that occurred before I was born. Delving deeply into my own memories has often been uncomfortable, emotional. It has stimulated dreams in which I talk with my father and grandfather and other relatives who were lost to me, asking them about their lives, telling them about mine—and revealing how they have influenced, even in death, the way I have lived my own life.

During this period of looking inward, I also began searching for the origins of the four paternal lines that converged with my birth—the ancestries of my two grandfathers and two great-grandfathers. One of these ancestries is still a mystery. It may lead me to mid-18th century England, but the trail has gone cold. The other three led to western Europe between the 18th and the 16th centuries. But there the record stopped, at least so far as my patrilineal ancestry was concerned. And I had virtually no documentation of my maternal ancestry, the female lines that married into the male ancestries. Fortunately, maternal ancestry can be revealed through genetics. And, surprisingly, those genes can be traced back much further in time than the surnames of my male grandparents.

But lately, I've been paying much more attention to the more recent past, and other origins. My own.

Back to the Ice Age

The genes that tell us about our maternal ancestries are, in a strict sense, not even ours. They are found in the DNA of small bodies—called mitochondria—that occur in the cytoplasm (outside the nucleus) of each cell in our bodies. The mitochondria produce enzymes that allow our cells to use oxygen—giving them energy.

Mitochondrial DNA (mtDNA) is inherited only through the mother from eggs produced by the female germ/sex cells. The mitochondria in male sperm cells are lost during or after fertilization, leaving only the mother's mtDNA in the developing embryo's cells. This means that maternal ancestry (of males as well as females) can be traced back in time from child to mother to grandmother to great-grandmother, and so on, right back to the beginning of the chain, to a point in time when "signature" mutations (or changes) first appeared—marking the start of that female lineage.

I learned all this rather late in my search for the origins of my own family, from a book written for the general public, *The Seven Daughters of Eve*, by Bryan Sykes, a geneticist at the Institute for Molecular Medicine at Oxford University in Britain. From more than 10,000 samples of mtDNA obtained from people across Europe, Sykes and his colleagues identified seven major genetic lineages (and more recently an eighth).

For this analysis, geneticists use only part of the mtDNA—a very short segment called the "control region," which is only 1,000 chemical base pairs long compared with the 16,500-plus base pairs in the entire mtDNA chromosome (and 3,000 million base pairs in DNA from the nucleus of a cell). The specific sequence of base pairs at certain "marker" locations in the control region defines each of the major genetic lineages in Europe.

The approximate age of each lineage could then be calculated from the average number of mutations in each and the estimated rate of mutation—the larger the number of mutations, the older the lineage. Similarly, researchers determined that each lineage most likely originated in the geographic region where people of that lineage have the greatest genetic variation today.

From this, Sykes and his colleagues constructed a diagram they thought revealed the population history of Europe from the time modern humans first arrived, perhaps 40,000 years ago (overlapping the Neanderthals), through to the appearance of agriculture 10,000 to 8,000 years ago.

I was intrigued by this and, on a whim, sent a swab of saliva containing my DNA to Oxford Ancestors Inc. and asked them to tell me which of the seven lineages I belong to. About three months later I got my answer. In the 400 base-pair sequences that were examined, mutations were found at four "marker" locations: 129, 223, 304, and 391. This pattern put me into a genetic lineage called X.

The letter X was the original laboratory designation of this lineage. Later in Sykes's research, when it appeared that mtDNA studies could reveal maternal ancestry and perhaps even the population history of Europe, the seven (now eight) lineages were given popular names derived from the geographic regions where they appear to have originated. Lineage X was given the name Xenia (from the Greek word for hospitable). It includes approximately seven percent of today's native-born Europeans. Significantly, the lineage is believed to have originated on the eastern edge of the Black Sea in the northern Caucasus and can be traced back in time to a female who lived approximately 25,000 years ago.

This Eve-like person, one of the seven daughters in the title of Bryan Sykes's book and matriarch of the Xenia clan, is not the only woman in lineage X who was alive at the time; however, she is the only one who left an unbroken line of female descendants. And male descendants, such as myself, who inherited their mtDNA from her.

Lineage X—Xenia's clan—has two other important characteristics. It can be subdivided into three branches, based on the distribution of people today who have inherited Xenia's mtDNA. Two branches spread to central Europe and as far west as France and Britain. The third branch, largely confined to Eastern Europe, must also have spread farther east. Much farther, since about one percent of Native Americans are also descendants of Xenia. I was stunned when I first read this. Because if true, it was strangely ironic.

Top: Two pathways of genetic ancestries to the New World: 25,000 years ago to present day.

Bottom: Origins of the genetic lineages described by Bryan Sykes in his book *The Seven Daughters of Eve*.

Top map: Claire Louise Milne. Bottom map: Hand Made Maps Ltd.

Artist's interpretation of Early Paleo-Indians caribou hunting in Ontario 11,000 years ago.

People of the Mammoth Steppe

As a curator, I focused my research on the lives of Early Paleo-Indians, one of the earliest colonizing peoples of the New World and the first people to occupy Ontario. There are many questions but the most fundamental concerns their origins. There is no doubt that the New World was colonized by peoples from Siberia, and northeast Asia generally, at the end of the last Ice Age. And while no Early Paleo-Indian sites have been found in northeast Asia (the culture apparently having developed in North America), Paleo-Indian stone tool technology has a Eurasian Upper Paleolithic look to it. It is this that identifies the ultimate Eurasian origins of the people who would evolve into North American Early Paleo-Indians roughly 12,000 years ago, if not slightly earlier.

Twenty-five thousand years ago, when the people of Lineage X lived in the Black Sea region, the Ukraine to the northwest was occupied by Upper Paleolithic hunter-gatherers famous for the large, domed winter houses they built of interlocked mandibles, tusks, and bones of woolly mammoth. The people of Lineage X were probably closely related to those in the Ukraine. Indeed, at the time, Upper Paleolithic peoples were widespread in Eurasia and occupied a vast steppe called the Mammoth Steppe, named after the largest mammal in that environment—the woolly mammoth. Other cold, steppe-adapted animals also lived there—woolly rhino, caribou, woolly horse, steppe bison, saiga antelope; and predators—lions, wolves, cheetahs, hyenas, bears. South of the continental ice sheet, the Mammoth Steppe extended from western Europe across Russia and Siberia (which was largely ice-free) to Alaska and the Yukon Territory (also largely ice-free). Most archaeologists believe that when Eurasian Upper Paleolithic peoples spread north and then east, colonizing recently de-glaciated lands during the final retreat of the ice sheets, some groups crossed a land bridge exposed by lower sea levels between Siberia and Alaska and then moved south into the central part of the North American continent. Some of those colonizing groups may have been the ancestors of Early Paleo-Indians and also descended from Lineage X, Xenia's clan. As I am. If so, over a nearly 30-year career I had been studying very distant relatives, people to whom I am related in a measurable way—despite the 460 or so generations that separate us, longer still if I calculate from the more distant origin of Lineage X.

Looking Again, at the Other Half

The results of my mtDNA analysis were so interesting that I asked the same genetics laboratory to do an analysis of the genes in my Y chromosome. This is the chromosome that determined my sex, inherited only through males.

The analysis of a short segment of the DNA in my Y chromosome at 15 marker locations produced a genetic signature that is useful in tracing ancestries over several tens of generations. More importantly (for my interest in determining origins), the signature can also be correlated with one of several genetic groupings, technically called haplogroups or clades, in another system of genetic classification that is useful in interpreting long-term evolutionary history. In this system, the genetic signature of my Y chromosome can be correlated with a high level of confidence with a clade given the letter designation "I" and the popular name Wotan, the name of the German god of battles. This name was chosen because it reflects roughly the geographic area where people with this genetic signature live today. The highest frequencies of this signature occur among people in western Eurasia: in Armenia and Georgia (40%), Germany (20%), northern Europe (the Scandinavian countries, 30 to 33%), as well as in eastern England (33%), Scotland (15%) and Wales (11%). The frequencies in the British Isles probably reflect Saxon, Danish, and Norse influences.

Interestingly, the number of mutations in the Wotan clade suggests that it originated roughly 25,000 years ago in the Ukraine. This is consistent with my mtDNA, inherited maternally, which is thought to have originated at about the same time and in the same general region. Thus, my ancestry on both the male and female sides is clearly from western Eurasia. The "German" identity, revealed by three of the four surnames of my grandparents, came much later, first appearing, so far as genealogical records are concerned, between the 16th and 19th centuries, before Germany became unified. My proto-German ancestors emigrated to the New World (and another branch to Fiji in the Pacific) in the mid 19th century.

Much earlier, at the end of the Ice Age, other peoples to whom I am related through my mtDNA moved eastwards from the Ukraine and the Caucasus toward the New World. Several hundred generations later their descendants camped for a brief period on an island in a glacial lake. There, ten thousand years later, in another geological epoch and roughly an hour's drive northwest of Toronto, I discovered archaeological debris on the farm of Edward Banting* from a former camp occupied by Early Paleo-Indians. Although I didn't realize it at the time, a circle had closed.

My ancestry is the sum of the histories of all of my genes, not just the narrow pathways revealed in my mtDNA or my Y chromosome. In its entirety, my DNA—those helical threads of sugar and phosphate molecules coiled around nucleic acids—contains other histories in the long trail of descent from my late Ice Age ancestors and, before them, various forms of humans, pre-humans, primates, mammals—and earlier still to the very origins of heredity, and life itself. The past is within us, curated like museum collections in our DNA and in our memories. In life, in family, these are the threads that bind.

* **Edward Banting** was a nephew of Sir Frederick Banting, one of the co-discoverers of insulin, and Edward's farm had been Frederick's boyhood home. More information on the archaeological site is found in Storck's book for the general public, *Journey to the Ice Age*, published by the University of British Columbia Press in association with the ROM. It is available in the ROM Museum Store, at bookstores, and online.

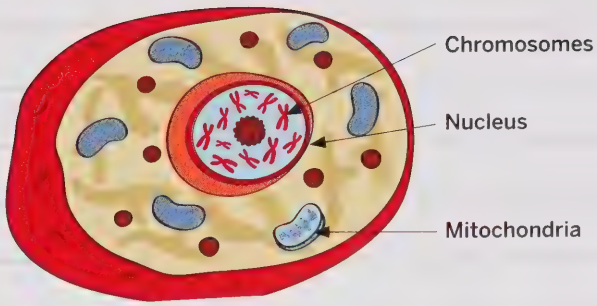
Illustration: Ivan Kocsis, ROM

DNA 101

DNA is a molecule found in every cell of every living organism (with the exception of some viruses). It stores the instructions for all aspects of an organism's development and functioning, coding for all traits: eye colour, height, number of fingers and toes, etc. The double helix structure of DNA is one of the most iconic images in biology, often seen in modern culture in everything from crime shows to ads for hair shampoo. DNA's two long intertwined strands are made up of subunits called nucleotides. Nucleotides themselves are composed of sugars, phosphate groups, and one of four kinds of bases—adenine, guanine, cytosine, and thymine. These bases play a crucial role: the bonds between bases of opposite strands hold the two strands together, and the order in which different bases occur along the molecule holds the genetic code.

There are 3 billion base pairs in the human genome, a blueprint carried in every cell in our bodies. If you took all the DNA molecules from a single one of your cells and put them end to end they would stretch to almost 2 metres in length. Lined up, all the DNA molecules from the estimated tens of trillions of cells in your body would be long enough to reach from the Earth to the sun and back again more than 100 times.

Except for identical twins, no two people in the world have exactly the same DNA sequence. This diversity is the result of mutation—the process whereby one base along the sequence either becomes switched for a different one or deleted, or a new one is inserted. Mutations can be the result of environmental factors, such as radiation or exposure to mutagenic chemicals, but most often they arise from errors introduced when DNA is replicated just before a cell divides—in other words, they are copying errors.



Mutations are not inherently bad. They are, after all, the raw material for evolution and without them we would not be here. They can be detrimental when their occurrence disrupts important genes. Hemophilia, the impairment of the body's ability to control blood clotting, for example, is one disease caused by a genetic mutation. But sometimes mutations confer benefits, such as the ability to digest lactose. This ability is lost by most mammals shortly after they are weaned. Several human populations have independently acquired mutations that allow them to use milk as a nutritious food source into adulthood. Such beneficial mutations have rapidly spread through pastoral societies.

Most mutations, however, seem to make no difference at all—either because redundancy in the genetic code minimizes their impact or because they occur in the large portion of our genome that doesn't appear to code for anything. These neutral mutations are the ones that scientists compare to trace human ancestry. **—O. H.**

How genetics is helping scientists reveal human history

The tools used to uncover the history of humans from our earliest origins to the rise and fall of ancient civilizations have traditionally been the trowel and shovel. In the last few decades a new tool has been added to this inventory: DNA sequencing.

To study human ancestry and migration, DNA researchers have initially focused on the Y chromosome and the mitochondrial genome because of the unique way these parts of the DNA are inherited. The mitochondrial genome (mtDNA) is inherited by sons and daughters exclusively from the mother while the Y chromosome passes down from father to son with no contribution from the mother. The remainder of the genome is more difficult to interpret because a process called recombination mixes together the sequences of both father and mother in a child's DNA.

Y chromosome and mtDNA sequences agree with the fossil evidence that points to Africa as the birthplace of our species and they reveal that most of the genetic diversity within our species is still found on that continent. The evidence also suggests that the rest of the world was colonized by just a small group of humans who left Africa between 70,000 and 125,000 years ago. As they spread throughout the world, different populations grew and diversified over the millennia, accumulating genetic mutations along the way.

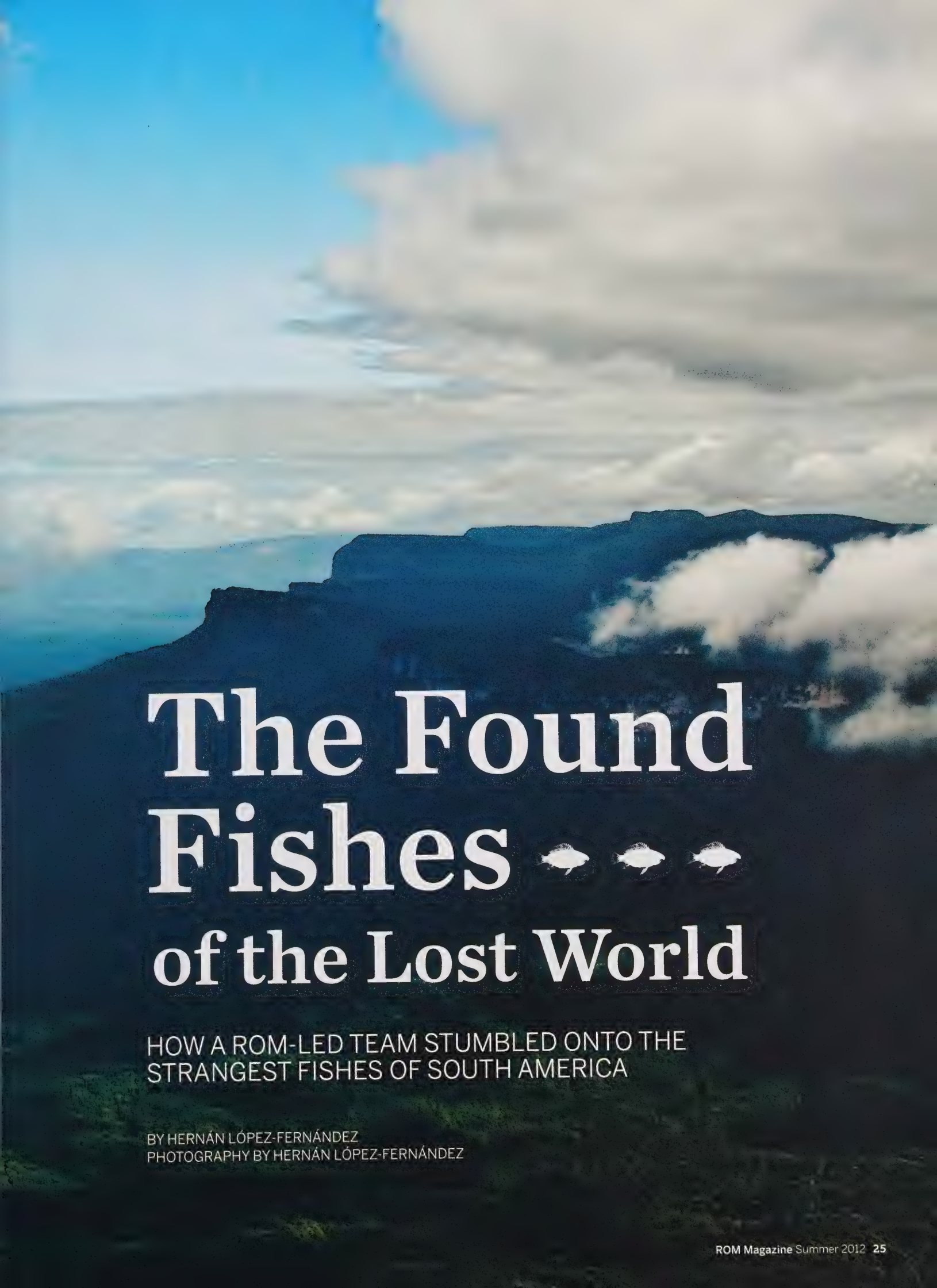
Scientists can now compare the DNA sequences of people all over the world and, working backwards, reconstruct a family tree for the whole species. Back in 1981, a researcher by the name of S. Anderson was the first person to have his entire mitochondrial genome sequenced. Today, when we analyze an individual's mtDNA, this original sequence—referred to as the Anderson sequence or the Cambridge Reference Sequence (CRS)—is the one to which it is compared. "Mutations" are simply any base pair along the sequence that differs from the Anderson sequence.

Tracing our ancestry using the Y chromosome is more involved because compared with mtDNA there is less variation between individuals in this chromosome. The process is fundamentally similar, the difference being that the reference sequence is not from an actual individual but from a theoretical common male ancestor. Worldwide, there are now more than 30 recognized major mtDNA haplogroups, or lineages. At the moment, Europeans are the most extensively sampled population (the seven or eight haplogroups mentioned in "The Threads That Bind"), but an ever-increasing database of haplogroups and their geographic distribution is helping to untangle the history of the movements of peoples around the world.

Recent advances in genomic sequencing have gone beyond using just mtDNA and the Y chromosome, and have shown that the modern human gene pool contains DNA from other hominid species, such as Neanderthals and the yet-to-be-described hominid recently discovered in Denisova Cave in Russia. All this new evidence is revealing that our family tree is even more complicated than anyone ever imagined.

OLIVER HADDRATH is a technician and DNA expert in the Ornithology section of the ROM's Department of Natural History. Haddrath was one of the first to sequence a mitochondrial genome from an extinct bird species, the giant moa.

Illustration: Claire Louise Milne



The Found Fishes of the Lost World

HOW A ROM-LED TEAM STUMBLED ONTO THE STRANGEST FISHES OF SOUTH AMERICA

BY HERNÁN LÓPEZ-FERNÁNDEZ
PHOTOGRAPHY BY HERNÁN LÓPEZ-FERNÁNDEZ

"All that is gold does not glitter . . ."
J. R. R. Tolkien, *The Lord of the Rings*

An Unexpected Phone Call with an Unexpected Outcome

I had been in Toronto for a couple of months and was still shocked by the cold. I was so new at the ROM I still got lost on the way from my office to the coffee shop. When the phone rang it was my former professor and friend Don Taphorn, with a message from professor Calvin Bernard at the University of Guyana: "Do you want to go fish in the upper Mazaruni?" I couldn't believe it! He had gotten us permits to go. One Latin name came to my mind as if etched in my brain: *Mazarunia mazarunii* . . . the one cichlid fish—the group I do most of my research with—that I had given up on studying because it might as well have come from another planet. While we talked, my head was already making a list of what we would need: boats, planes, nets, cameras, and a million other things.

It may be hard to understand that the name of a river and a fish could send anyone into such a state. But it wasn't just any fish, it was that proverbial "one that got away," because almost nobody has had any chance to study it. The upper portion of the Mazaruni River is so remote that by February 2008, when I received the call from Don, no formal ichthyologic expedition had ever explored it. *Mazarunia* was known from two specimens originally collected with a handful of other fishes by a biologist who was evaluating the viability of a hydroelectric dam project in the '70s. Just about all we knew of the river's fishes in 2008 came from some of those specimens that made their way to European museums. *Mazarunia* was described in 1991 by Sven Kullander from the Swedish Museum of Natural History in Stockholm. He described the two specimens as a new genus and species: *Mazarunia mazarunii*. Looking at its internal anatomy or studying its DNA was simply out of the question with something so rare. The very name of the fish reflects that the species occurs only in the Mazaruni: it is "endemic" to that river basin. Two other fishes described from that collection, *Skiotocharax meizon* and *Derhamia hoffmanorum*, were also endemic, meriting their own genus and species.

Everything else we knew about these fishes came from the aquarium community: sometime after the description of *Mazarunia*, German aquarists had gone to the upper Mazaruni and brought back a few live specimens of the fish. Among them was another cichlid they called "red patwa," a Guyanese Amerindian name meaning "red cichlid." Altogether, these fishes prompted more questions than answers: why were they in the highlands and how were they related to lowland forms? How did they become so rare? The questions lingered for years, unanswered until Don called me in the middle of winter.

Top left: *Moenkhausia* aff. *browni*, one of the fishes we still don't have a final name for

Left: Don Taphorn looks for some of the elusive fishes lurking in the fast waters of Waruma Creek, a tributary of the Kako River

Right: The fish we called "blue eyes" in the field turned out to be the previously described *Skiotocharax meizon*.

Left: With swift currents running through the rainforest, Membaru Creek may actually be the place where *Mazarunia mazarunii* was first collected

Below: Still without formal name, "zig-zag" is a new genus and species and one of the strangest and prettiest Mazaruni fishes.

Into the Lost World

Calling Georgetown, Guyana's capital, picturesque would be an understatement. Beyond the 40 degree change in temperature between winter and the tropics, the 100 percent humidity hits you like a brick wall, followed by an assault of colours, sounds, and smells. Then you get busy: getting permits for everything imaginable, buying food, arranging planes, making sure the gear doesn't weigh so much that the charter plane can't take off safely. All this in mad traffic that makes you cross your fingers not to run over the children, cyclists, and all sorts of vending kiosks that crowd the streets. A week later, the rackety Cessna heads into the wall of clouds, rain coming through the windows, soaking clothes and camera, and you are unsure why you came.

But then the clouds break and you remember. The 500-metre wall of rock appears out of nowhere and the thick rainforest—Guyana has some of the largest intact patches of rainforest anywhere in the world—is suddenly so close under the plane that you can distinguish individual trees. Deep canyons are carved into the flat top, dripping with waterfalls hundreds of metres high. We are flying over the escarpment of the Guiana Shield: a 2-billion-year-old massif that forms the very foundation of South America and traces the ancestry of the continent to its now far-flung sister, Africa. Farther in the horizon rise the abrupt and improbable "tepuis," awe-inspiring flat-top mountains populated by ancient dinosaurs and savage peoples in *The Lost World* of Conan Doyle's imagination. These ancient highlands have been isolated from the rest of South America for so long that almost everything that lives up here is unknown anywhere else in the continent.

This gives me the first clue as to the importance of what we may find here. I quickly realize that the upper Mazaruni is the final path of a myriad streams draining the far-looming slopes of the tepuis before plunging down the escarpment's wall in waterfalls that no fish can swim through. This is why *Mazarunia, Skiotocharax,* and *Derhamia* are unique and look so different from other South American fishes: they have been trapped in this upland watery island for untold ages. In the absence of contact with lowland fishes, these ones have followed their own evolutionary path, adapting to an environment that has shaped their form and biology in whimsical ways.

THIS IS WHY *MAZARUNIA*, *SKIOTOCHARAX*, AND *DERHAMIA* ARE UNIQUE AND LOOK SO DIFFERENT FROM OTHER SOUTH AMERICAN FISHES: THEY HAVE BEEN TRAPPED IN THIS UPLAND WATERY ISLAND FOR UNTOLD AGES

My musings are interrupted by the rough landing on the dirt "runway" of Kamarang village. Waiting for us is Kelly Kramer, our guide into the upper Mazaruni, one of the best dugout canoe pilots I have ever seen. Soon we are steadily motoring upstream through the thickly forested upper Mazaruni. Four hours later we stop for the night just before dark and set up camp in the forest at a bend in the river. Our camp is a deceivingly stable contraption made of thin logs with a large tarp thrown over top and serves as kitchen, bedroom, and makeshift laboratory.

Top: The massive buttresses of this forest giant serve as a perch for an entire community of orchids and bromeliads by our camp in the Kako River.

Bottom: Hernan Lopez-Fernández collecting samples for DNA analysis in our improvised lab at Kamarang

Right: *Mazarunia mazarunii*, one of what we now know are three species of cichlid fishes that live only in the upper Mazaruni River basin along with several other unique species.

The Found Fishes of the Lost World

As soon as we hang our hammocks we get into the water. By the time we drag the first net on the river bottom and pull it up to see what we have, we know this place is different. The first surprise is how few fish we catch. The second is that we can't quite say what they are. Especially that brown armoured sucker-mouth catfish that looks so familiar but at the same time so strange. Sucker-mouths are a very common family in South America with more than 800 species. But this one doesn't quite fit anything we know. Don finally writes it down as possibly belonging to the genus *Neblinichthys*, a rare group that is known from the Venezuelan portion of the Guiana Shield but has not been reported for Guyana. That's exciting: if Don is right, this one would certainly be a new species . . . and that is our first net haul. Along with the *Neblinichthys* we collect a few silvery tetras in the family Characidae, which are somewhat the equivalent of North American minnows: silvery, small, and very difficult to identify correctly without a good microscope, a decent library, and lots of patience—definitely something to look at when we get back to the ROM. Another fish is even stranger: tiny, beautiful, with a light blue iridescent sheen over a mild orange base, red fins, and a shiny blue eye that sparkles in the afternoon setting sun. Problem is, we don't even know what family it is, let alone what species. Imaginatively, we write it down in our notes as "blue eyes" and end the day completely puzzled but giddily anticipating what else we might find in this strange place. No trace of *Mazarunia*, though.

The next day we keep moving upstream. Rapids frequently force us to step out of the boat and push it through the current. The river here is shallow, only about a metre deep, full of logs, rocks, and plants growing on the bottom; a bit like fishing in a nicely decorated aquarium. We find a few more species, but none are any easier to identify: one beautiful tiny fish is canary yellow with a jet black zigzagging band along its side. Outdoing ourselves in originality, we write it down as "zigzag" and move on, unsure of the family and clueless about the genus, but certain we have something with no name. Another one, long, thin, with a black line

along the body and a red tail, we record as "*Nannostomus*?"—a guess based on what we have seen before in lowland rivers. Late afternoon we catch a small juvenile cichlid . . . finally! But it isn't *Mazarunia.* Kelly immediately pronounces it a little red patwa, the other cichlid the aquarists had found . . . now that is awesome! But were we going to find any familiar fishes in this river? I'm starting to feel like a 19th-century naturalist going for the first time into the Amazon or the Galápagos.

That night brings some more incredible finds: the first adult red patwa, found in the rapids, is an unusual brownish purple and shaped like no cichlid I know. A knife fish Don and I recognize and quickly call *Sternopygus*—case closed. Or so we thought until we got back home where its skeleton and DNA turned out to be unlike any known knife fish . . . so no name for that one either. Another one is clearly a "South American darter" in the genus *Characidium,* but more than likely a new species. The next one Don thinks is another "darter" in the genus *Ammocryptocharax*—but this thing is about twice as big as it is supposed to be, and the mouth is all wrong . . . but we have to move on, so we call it *Ammocryptocharax* until we can look at it back home.

That night it starts raining, and it doesn't stop until we leave the river. Rain soon brings the water up, flooding the places where we can fish. We spend hours every day sitting in the boat; we are a sodden, shivering mess. We move on to a tributary, the Kako, but it has been raining so hard the water is already too deep to fish. We head upstream to higher slopes and find a few places we can continue our work. In the process we realize something else about the fishes of the upper Mazaruni: just as surprising as the strange fishes we are finding is what we are *not* finding. We have not seen any fish bigger than a few inches long; entire families are missing. The very icons of the South American fish fauna are absent. No piranhas, no stingrays, no large catfishes, no big fishes of any kind. The lack of large fish has an unexpected consequence for our plans: we are hungry. In regular trips, our guides are frequently catching fish for food—and usually no argument convinces them to donate any tasty specimens to science—but in the upper Mazaruni there are no big fish to be had. Soaking wet and constantly cold, we are living on peanut butter and jelly on soggy crackers. Breakfast is the tasty exception with instant oatmeal, raisins, and decaf instant coffee.

Days later, back at Kelly's house, sitting comfortably by the fire, dry and now well fed, we take stock of what the upper Mazaruni has shown us. We collected about 30 species of fish, and of those we have more or less reliable names for 10, so at least 20 species are new to science. We are confident that most of them don't exist anywhere outside the upper Mazaruni basin. Today, four years after that trip and having gone back twice more, our numbers total 35 species, of which 31 (or nearly 90 percent) are endemic to the upper Mazaruni, and of those, 22 remain unnamed. We have described one new genus and six species, and are working on several more. Also, we have built a family tree of all South American cichlids, including the *Mazarunia mazarunii* we eventually collected. Combining DNA analysis and fossil dates, we discovered that red patwa is actually another species of the genus *Mazarunia.* This also allowed us to estimate the age of *Mazarunia* to be about 20–25 million years. It appears that the fishes of the upper Mazaruni have been isolated from other South American fishes for a long time indeed.

But the story didn't end in Kelly's kitchen. In our final excursions we saw something else on the river that left us with an urgency to return to the upper Mazaruni to look at more than the fishes . . .

Look for the second part of The Found Fishes of the Lost World in the next issue of ROM Magazine.

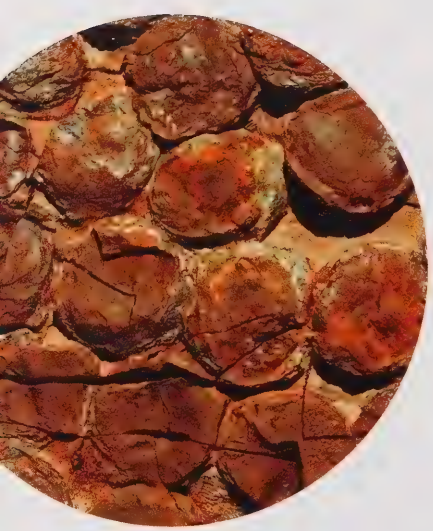
Above:
Neblinichthys echinasus. This "punk catfish" is one of several new species of fishes described by the ROM team since our 2008 expedition to the Mazaruni; several more are still in the works

Left:
The colour of black tea, a tributary of the upper Mazaruni traverses the untouched rainforest. the colour of the water is due to chemicals leaching from the fallen forest leaves.

Nesting Instinct

From the field, the story behind finding the oldest known dinosaur nesting site in the world.

BY DAVID EVANS



In 2006, as three fruitless days of fieldwork were coming to an end, I sat down on a steep slope, frustrated. I was in South Africa's Golden Gate Highlands National Park with an international team of paleontologists, funded in part by a National Geographic Society grant, searching for dinosaur eggs, and so far—nothing. Losing hope of finding the sub-millimetre-thick eggshells in this small hillside road cut, I started skipping stones down the scree slope. One of the rocks I was mindlessly pulling from the cliff face behind me felt particularly round in my hand and before throwing it I took a look. It was an almost perfect dinosaur egg. Amazed, I looked back and could make out the faint outlines of another half dozen eggs lined up in a neat row in the rock. I knew right then that I'd found something extraordinary.

Our team, led by paleontologist Robert Reisz of the University of Toronto at Mississauga (UTM), detailed this and other discoveries in the January 2012 edition of the *Proceedings of the National Academy of Sciences.* That first find in 2006 was just the start of an incredible journey—the 190-million-year-old rocks of that road cut turned out to hold much more than a single dinosaur nest—it appears to have been a popular nesting site, the oldest one ever known. Over the following three years, we uncovered eight more nests, a wealth of fossils that provide science with its first glimpse into the reproduction of dinosaurs early in their evolutionary history.

Like all stories of discovery in paleontology, this one has a long history. The first eggs from our site were actually discovered by famed South African fossil hunter James Kitching in 1977, in the rubble of what was then a freshly constructed road cut now within Golden Gate Highlands National Park. Kitching recognized that his small batch of seven eggs still contained tiny embryonic bones, but they were too delicate to prepare. Kitching never did confirm which animal the eggs and embryos belonged to—though he suspected they were those of the early plant-eating dinosaur *Massospondylus,* whose fossils were common in the nearby rocks. The little work done on the eggs since Kitching's find seemed to cast doubt on their dinosaurian origin.

A scene of a *Massospondylus* nesting site.

Then, in 2003, UTM's Reisz was shown the eggs and instantly recognized their significance. He borrowed the small chunk of egg-containing rock, confident that the embryos could successfully be extracted. A year later, expert preparator Diane Scott had uncovered perfect embryonic skeletons. They were unmistakably dinosaurian—and, as Kitching suspected, belonged to the sauropodomorph dinosaur *Massospondylus*. The completeness of the skeletons enabled us to identify them unequivocally as those of this 6-metre-long vegetarian with a small head, long neck, and long tail.

At that time, I was a graduate student at UTM, and I was invited to join the project to analyze the amazing growth series of complete skeletons for this dinosaur, which, with the addition of our new embryonic ones, now covered the entire life cycle from embryo to adult. The three-year study revealed something unexpected. Not only were our new skeletons by far the oldest known dinosaur embryos (*Massospondylus* lived during the Early Jurassic 190 million years ago) they also revealed that this dinosaur started life on four legs, becoming bipedal as it grew. The solidly quadrupedal stance of the later giant sauropods, such as Gordo, the ROM's *Barosaurus*, and the massive *Futalognkosaurus*, which will be on display during the *Ultimate Dinosaurs* exhibition, mirrored the baby proportions of their forebears, an evolutionary phenomenon known as paedomorphosis—adults retaining juvenile traits. You could say, at least with respect to their front leg proportions, that sauropods were "big babies." In 2005, we published our results from this study in the acclaimed journal *Science* and made headlines around the world.

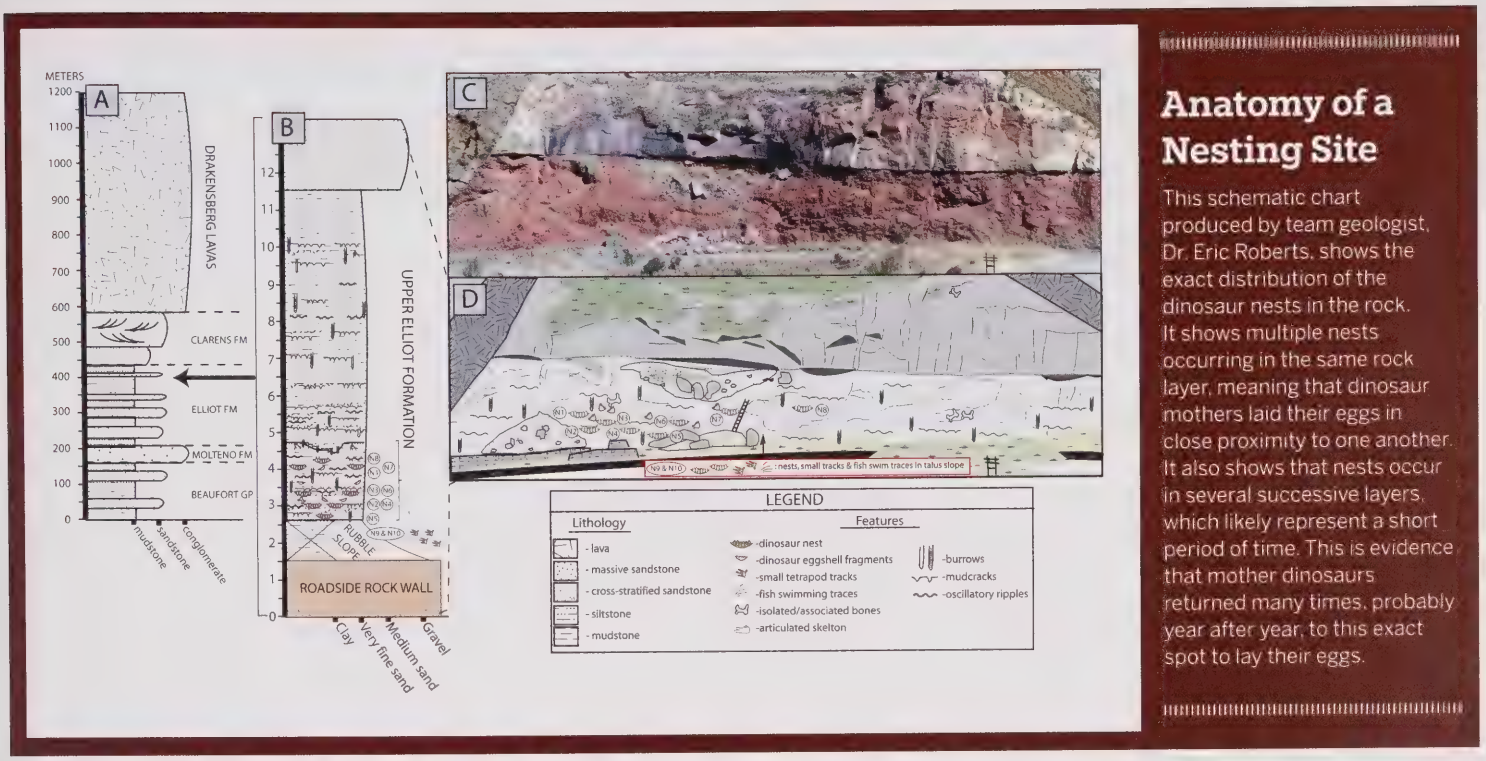
As amazing as the fossil embryos were, in 2005 their discovery was still just an isolated occurrence. Though the find site was well known—it was a popular stop for geology class field trips—no one had found further evidence of fossil eggs since Kitching, and in a road cut only 30 metres long, his discovery in itself was incredible. Still, the outstanding quality of the fossils convinced us that there must be more eggs hidden in that hill, and we became determined to find them.

That's how we came to be in South Africa in 2006. It took almost two weeks to excavate that first nest I found in the hillside. The work was tough because the surrounding rock is harder than cement. We had to use rock saws and jack hammers to free the nest. In the end, the freed chunk of rock wrapped in a plaster cast measured about 1 metre long by half a metre wide and deep, and it weighed about 200 kilograms. Once we got it back to the lab, it yielded an almost complete clutch of 34 eggs the same size and shape as the ones Kitching had found, so we knew we had another *Massospondylus* nest.

Top left: The original clutch of eggs with embryos found by James Kitching, after preparation by Diane Scott.

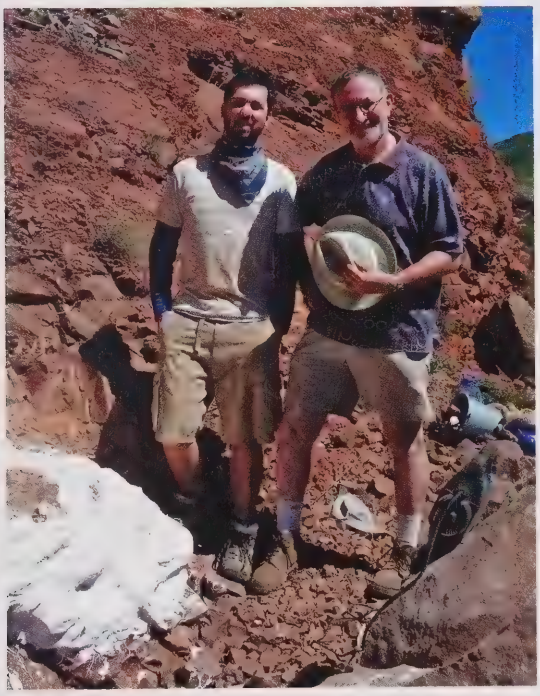
Left: The road cut in beautiful Golden Gate Highlands National Park where the dinosaur nests were discovered. These bright red rocks host the well-preserved 190-million-year-old fossils. In addition to the nesting site, these rocks have yielded a great diversity of plant and animal fossils, including numerous dinosaur skeletons.

Photos: Ian Morrison. Chart: Eric Roberts.



Anatomy of a Nesting Site

This schematic chart produced by team geologist, Dr. Eric Roberts, shows the exact distribution of the dinosaur nests in the rock. It shows multiple nests occurring in the same rock layer, meaning that dinosaur mothers laid their eggs in close proximity to one another. It also shows that nests occur in several successive layers, which likely represent a short period of time. This is evidence that mother dinosaurs returned many times, probably year after year, to this exact spot to lay their eggs.



David Evans (left) and Robert Reisz in the field. The white block of plaster contains a partially excavated dinosaur nest.

This discovery encouraged us to mount a series of three more expeditions, the last in December 2009. Now knowing what to look for, we found another eight nests, several with embryonic remains poking out of their eggshells. Our team's geologist, Dr. Eric Roberts, determined that all the nests came from the same 2-metre-thick, 20-metre-long rock unit. The nests were preserved in fine mud, the result of very low-energy flooding from a nearby river. The amazing density of nests and their distribution within the rock showed that multiple *Massospondylus* mothers had laid their eggs in very close proximity, perhaps even nesting in colonies like birds, and that the mothers returned to the same site year after year to lay their eggs. This is by far the oldest evidence of these reproductive behaviours in dinosaurs—and land-living vertebrates in general.

Just why the dinosaurs chose this spot we may never know, but we can presume that the environmental conditions were right for this particular species because the site was used year after year over at least several hundred years. If the dinosaurs came together for more than the advantageous nesting conditions, gregarious nesting may have provided safety in numbers for the mothers, their nests, and the newly hatched young. Incredibly, our study even uncovered tiny footprints of baby *Massospondylus*, indicating that the babies stuck around the nesting site for some time after hatching, until they had at least doubled in size.

How dinosaurs reproduced and cared for their nests and young has fascinated scientists and the public since the world's first discovery of dinosaur nests—they were found in Mongolia—was publicized 90 years ago. Yet for most dinosaur groups we still know surprisingly little about these matters. Our *Massospondylus* nesting site dating to the Early Jurassic provides ancient evidence that seemingly complex nesting behaviours, including group nesting and repeated use of a nesting site over time by a single species, were already taking place by the start of the Jurassic. Previously, these behaviours had been well documented only in Late Cretaceous dinosaurs—more than 100 million years after *Massospondylus*.

The large size of the *Massospondylus* mother, 6 metres long, the small size of the eggs, about 6 to 7 centimetres in diameter, and the highly organized nature of the nest suggest that the mother may have arranged the eggs carefully after laying them. The evolutionary context and size of the egg clutches also suggest that *Massospondylus* cared for its nests and hatchlings at least to the level that crocodiles do today. All these findings allow us to better understand the evolution of reproductive traits of dinosaurs as a whole, and suggest that group nesting and yearly use of the same nesting site may have been strategies used by the earliest dinosaurs and passed on to many different dinosaur groups through shared ancestry.

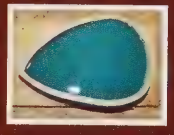
Although these new insights paint a far more detailed picture of dinosaur life in the Early Jurassic, there is still much to learn and many more important discoveries to be made. ○

Massospondylus will be on view in the ROM-developed exhibition *Ultimate Dinosaurs: Giants from Gondwana*, curated by David Evans. The show runs from June 23, 2012, to January 6, 2013.

Rock Artist

THE SCIENCE OF LINE, COLOUR, AND SHAPE

BY LEE-ANNE JACK



Ian Morrison sat poring over the red stone surface, nose to rock cliff, in the ongoing search for dinosaur nests. Scouring the same South African road cut where paleontologists David Evans of the ROM and University of Toronto's Robert Reisz had made their first find three years earlier, they were checking every visible white fleck for the telltale tiny white curve that indicates eggshell embedded in the rock.

Hunting for fossils is not an everyday job for ROM technician Morrison. As the ROM's senior paleo preparator, he spends much of his time in the lab painstakingly releasing fossils from the rock they're embedded in. His goal in joining the field trip wasn't strictly to help look for eggs and dig out nests. Trained in the fine arts, rather than paleontology, Morrison was gathering information to create an accurate cast of the dinosaur nest and eggs for display in the ROM exhibit *Dinosaur Eggs & Babies: Remarkable Fossils from South Africa*.

But having his trained eye checking white flecks paid off. He hit paydirt just minutes after Evans had also found a nest in rock nearby. A tiny toe bone suggested that Morrison's find held embryos.

Having a keen eye is part of the toolkit Morrison has developed over his 22 years on the job. In the paleo lab, against the high-pitched whine of grinding tools, he explains that preparing fossils is a highly visual process. "My brain can be listening to music, but visually I'm completely focused and reacting to what I'm seeing. In some ways it's like making art. I get into this mode where I'm just reacting to line, colour, shape, and everything else."

And each fossil is different. "There's a learning curve for every fossil, about how the rock wants to come off," he says. "And that's learning how the rock works, how it cracks, how it breaks. Sometimes you take the rock down almost to the level of the fossil and it just separates beautifully. You have to get a feel for how subtle it is to do that." Under a stereo microscope—one with two eyepieces that together provide a three-dimensional view—Morrison will work at one tiny area of fossil at a time. He draws on his experience to accurately predict the results he'll get from each tool—needles, grinders, and various air scribes, which he describes as mini-jackhammers similar to dental tools—to bring out details in specifc bone and matrix that might otherwise be lost.

Last year under Morrison's supervision, contract technician Shino Sugimoto prepared the first dino nest from South Africa to come to the ROM lab. When the fossil-containing rock was removed from its protective plaster-and-burlap jacket, the researchers ran UV light over it to check for organic material. They wondered if, like some birds, these dinosaurs may have regurgitated food around the eggs to help keep them warm. Nothing was found in this nest.

Preparing the nest from rock that is harder than cement required a slow pace and a lot of patience over the 13 months it took to complete the job. Depending on what's needed for their research, curators advise on how much of the fossil should be exposed from the rock. With particularly valuable material, such as dinosaur eggs that could contain embryos, they may decide to prepare only a limited portion, setting aside the rest for a future time when better techniques may be available. Before drilling into the eggs to see inside, countless photographs and measurements were taken so that no data would be lost in the process. In this clutch, all the eggs were tested for contents and turned out to be empty.

To create the display dinosaur embryos, Morrison took a mold from the nest that belongs to South Africa and made a plastic cast from it. The cast is precise enough that when fitted to the "counter"—the other half of the real fossil—the cast and the real fossil eggs actually click together as though they were two faces of the same fossil. The aim of Morrison's paint job was to make the cast look as realistic as possible.

Earlier this year, Morrison made headlines when a dinosaur was named in his honour: *Gryphoceratops morrisoni*. About eight years ago, the ROM's David Evans came across some intriguing bones collected by a previous ROM expedition in 1950. Since then, Evans and Dr. Michael Ryan, curator at the Cleveland Museum of Natural History, had been puzzling over how the jaw bones could fit together. As a last-ditch effort, they handed the pieces to Morrison. Morrison had it solved within 10 minutes and reconstructed within the hour.

Having no academic knowledge of dinosaurs worked in his favour. "David knows these animals so well—I've seen him walk in, glance at a little chunk of fossil and say 'ok, that's part of the parietal.' But I didn't have a preconceived idea of what this jaw should look like." Instead, Morrison relied on his discerning eye and his lifelong love of puzzle-solving to distinguish the inner from the outer sides of the bone and recognize clues in patterns, colours, and the shapes of cracks in the bone.

It's a skill he's often used while quarrying dinosaur skeletons, whose re-assembly sounds a bit like assembling Ikea furniture. For the excavation, a series of grids is staked above the skeleton in the ground with string, and all the surface fragments from each grid are collected in corresponding bags before the digging begins. When the team starts excavating the dinosaur, often what they find are partial vertebrae and ribs—and they have to go back to check the bags for the missing parts. "It's uncanny how you can click them all back together again after this stuff's been out there for millions of years and animals have walked over them, rain has fallen on them, and they freeze and thaw," says Morrison. "It's pretty cool."

For Morrison, finding the right fit for wayward bones offers the satisfaction of another puzzle solved. For science, that handiwork nudges our understanding of prehistoric life another step forward.

Photos: Ian Morrison by Brian Boyle. Mold-making: Ian Morrison

The Sigmund Samuel Gallery of Canada

BY GLEN ELLIS

Left: The Furniture of New France (detail). Artisans and cabinetmakers worked in pine (later painted), maple, yellow birch, butternut, Niagara-area black walnut, and (from the West Indies) mahogany.

Right: Gallery flagship artifact, *The Death of General Wolfe.*

A tribute to the great ROM patron Dr. Sigmund Samuel (1867–1962), the gallery is situated in the Weston Family Wing of the Museum's historic Queen's Park building (1933). Adjacent to the ROM Rotunda (dedicated in honour of Ernest and Elizabeth Samuel) and the Daphne Cockwell Gallery of Canada: First Peoples, the Samuel Gallery focuses on Canadian decorative and pictorial arts, from the time of New France, early Atlantic Canada, and Upper Canada, through to the end of the 19th century. It also includes folk art such as fanciful weather vanes, maple sugar molds in the shapes of beavers and maple leaves, and more recent images such as the the paintings of Arthur Heming and Rex Woods.

Along with the Cockwell Gallery, the Samuel Gallery encapsulates the nation's origins. Rob Pierce, incoming chair of the ROM's Board of Governors, describes it as an invaluable resource: "For new Canadians wanting to understand the origins of this country and the romance of Canadian history, there isn't a better place than these galleries. The wealth of historical artifacts and the genius of the displays create a virtual time travel through the first chapters of Canada's story."

One of the signature collections, early French-Canadian furniture is the largest and most significant outside Quebec. Founded in 1931 by ethnographer-folklorist Marius Barbeau and first ROM director Charles Currelly, it reflects stylistic influences from 17th-century France (especially Brittany and Normandy) and, after 1759, British and American influences to 1900. The collection is discussed and photographed in detail in *Rococo to Rustique: Early French-Canadian Furniture in the Royal Ontario Museum*, by Donald Blake Webster, published by ROM Press.

From Atlantic Canada, the work of cabinetmaker Thomas Nisbet is especially well represented. The furniture of Upper Canada on display reflects English, American, and German influences (both continental and Pennsylvania-German).

The ROM's is one of the world's premier collections of Canadian historical-documentary art. Comprising 3,800 watercolours and drawings and 365 oils, it spans two-and-a-half centuries of the Canadian experience, from circa 1750 to 2009.

The gallery text panels and labels provide insight into the position of Canada's pictorial art in the national psyche. On landscape: "Views of Canada are inextricably linked to one's ideas of what this place means. Laden with historical, cultural, psychological, and aesthetic impulses, Canadian landscape stokes the imagination and fosters desire, memory, and nostalgia, offering a stable mooring in a changing world."

The pièce-de-résistance of the gallery and one of the national treasures is *The Death of General Wolfe* (1776) by Benjamin West, one of five originals from the artist's studio. The painting, in the classical heroic style, departed from that tradition in depicting the personages in contemporary (1759) attire. Felled by sniper fire at the moment of victory, the general gazes skyward as light disperses clouds and battle smoke.

The Wilson Canadian Heritage Exhibition Room within the gallery is a venue for temporary exhibits related to Canada's history. It is named in honour of Lynton R. (Red) and Brenda Wilson in appreciation of their generous support of the Museum.

Painting, ROM 931.26.1

The gallery includes bilingual (English and French) video podcasts by Dr. Arlene Gehmacher, curator of Canadian paintings, prints, and drawings, and by Heidi Sobol, senior paintings conservator.

First in a series spotlighting the Museum's permanent galleries. ○

GLEN ELLIS is the executive editor of *ROM* magazine. He also manages the Royal Ontario Museum Press.

Sustaining Life in Canada's Seas

Will we learn from our mistakes in the Atlantic and Pacific in time to preserve the Arctic Ocean's fragile ecosystem?

BY MARY BURRIDGE AND CLAIRE HEALY

Oceans play such a major role in defining Canada that they form the basis of our national motto: "From Sea to Sea." From the early colonization of this continent by maritime peoples along the Pacific Rim, and European colonization via the Atlantic coast, to future exploration of the Arctic Ocean as it emerges from ice, Canada's past, present, and future are embodied by our three oceans.

Even though the Arctic, Atlantic, and Pacific are interconnected, each has its own unique features: currents, topography, biodiversity. At more than 200,000 km, Canada's is the world's longest coastline, 68 percent of which is in the Arctic. Including the exclusive economic zone (or "200 mile limit"), 36 percent of Canada's territory is ocean.

The earliest recognized and still most renowned underwater feature of Canada's oceans is the Grand Banks off the southeast coast of Newfoundland. There lies a group of underwater plateaus at relatively shallow depths. It is a place where the cold water of the Labrador Current mixes with the warm water of the Gulf Stream, lifting nutrients to the surface. Plankton flourish, providing the foundation of a complex, productive food web and one of the richest fishing grounds in the world. When John Cabot reached the Grand Banks in 1497, legend says there were so many cod in the water that one day his ship ceased moving. When his sailors lowered buckets, they pulled them up filled with cod.

This vast supply of Atlantic cod drew the first European fishers (and, later, settlers) to what is now Canada. For hundreds of years, the cod stocks seemed inexhaustible. But in 1992, following a 20-year decline, the cod population crashed and the fishery collapsed. The cause? Massive overfishing, facilitated by industrial methods and bottom trawling. The cod population was estimated to be 2 billion individuals at its peak, even greater than that of the American bison. The decline of the cod is considered to be the greatest loss of a vertebrate in Canadian history.

Not only did the cod almost vanish but so did 40,000 jobs in Atlantic Canada and a whole way of life.

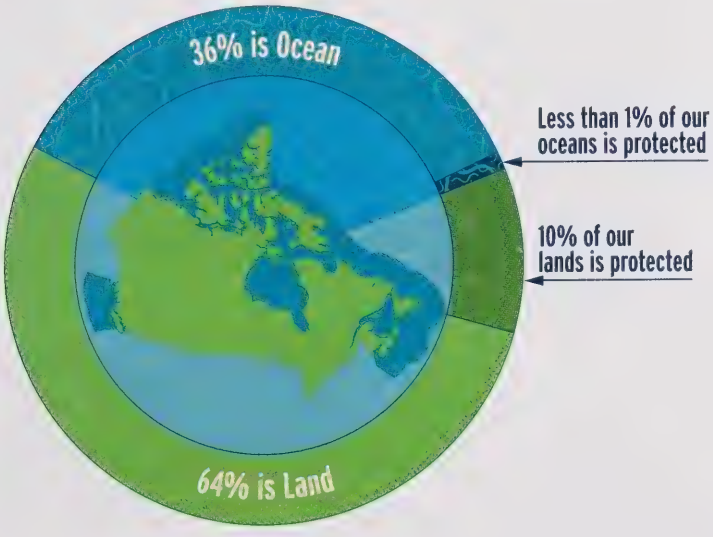
The Atlantic cod is a keystone species, playing a critical role in shaping the composition of its ecosystem. Its collapse affected not only the fishery, but also hundreds of species linked to it, as predators and prey, by complex food web relationships. Is there any hope for its recovery? The future for cod still seems bleak, although a glimmer of hope did surface in 2010. The southern

© Josef Friedhuber, iStock

Grand Banks cod population reached its highest level since 1994—but that was still just 10 percent of what it was in the 1960s. Clearly, only careful management of the cod fishery will enable this population and others to recover. Government, harvesters, retailers, and consumers alike must take part to ensure that such a disaster never occurs again.

On the west coast of Canada, an extraordinary ecosystem known as the Great Bear Rainforest is inextricably linked to the Pacific Ocean. This is one of the largest tracts of temperate rainforest left in the world, covering more than 2 million hectares of land. Here, wild salmon rivers and the adjacent cold-water seas provide food for such magnificent creatures as orca, humpback whale, coastal grey wolf, bald eagle, grizzly bear, and the rare and mysterious spirit bear. Pacific salmon, including chinook, coho, sockeye, chum, and pink salmon, connect life on land, river, and sea. These fish hatch in rivers, migrate to the sea to feed and mature, then return years later to the same rivers to spawn and die. Through this migration, salmon transfer nutrients from marine to terrestrial ecosystems, providing food for forest predators while they are alive, and nutrients to trees, scavengers, and fungi when they die. The key to Great Bear Rainforest's exceptional complexity is the interconnection of life between the sea and the rainforest.

After years of negotiation, Canada's Great Bear Rainforest has been permanently protected, and logging practices have been transformed across the region. Two marine conservation areas covering 3,500 km^2 also exist along Canada's Pacific coastal ecosystem. Currently at issue in the region is the proposed Northern Gateway pipeline that would bisect the rainforest to transport diluted bitumen across almost 1,000 salmon streams. Even a small spill could devastate Canada's Pacific coastal and marine ecosystems.



Info graphic: Emilio Genovese

Canada's Arctic Ocean, an understudied area relative to Canada's other oceans, and a site of continuing biodiversity discovery, is now heating up at a rate two to three times faster than the global average. As the summer pack ice shrinks, shipping channels become more navigable. Canada's infamous Northwest Passage, once sought by Arctic explorers, is fast becoming a transport shortcut between Northeast Asia and the Atlantic seaboard of Canada and the United States. Untapped oil, gas, and mineral reserves, along with opportunities for industrial fishing, are fuelling a race to exploit the Arctic's resources.

We have a chance to learn from our errors in Canada's other oceans. Or will we make the same mistakes in the Arctic? Little is known of the Arctic ecosystem except that it is more fragile than those in temperate oceans. Fish species are important not just to the Inuit but to marine mammals and sea birds. A conscientious approach to developing resources such as commercial fisheries is vital to maintaining the ecological balance that currently exists.

Our planet's most serious ecological crisis is happening in its oceans because of over-fishing, pollution, climate change, ocean acidification, habitat destruction, shipping, and resource extraction. To preserve Canada's oceans as a source of food, we must change our practices and engage in sustainable fishing.

A global movement to support and promote sustainable fisheries is being driven by programs from many non-governmental organizations. Monitoring fisheries practices and impacts is difficult, but not impossible. By choosing sustainable seafood, a consumer is choosing a product that is farmed or harvested from the wild with minimal impact to the ecosystem from which it comes and without jeopardizing stocks for future generations. Sustainable fisheries also limit habitat degradation and bycatch (the unintentional catching or killing of marine life while fishing for other species). Ultimately, consumer demand influences fisheries practices, so programs promoting sustainable fisheries serve to aid consumers in driving positive change in increasingly imperilled ocean ecosystems.

On your next trip to the supermarket, you can do your part by asking for sustainable seafood products. ○

MARY BURRIDGE is an assistant curator in Ichthyology and **CLAIRE HEALY** is an associate curator of Invertebrate Zoology, both in the ROM's Department of Natural History.

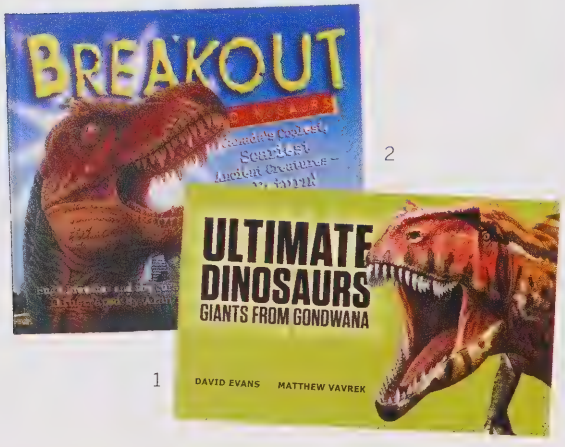
Ultimate Dino Books and More

In the ROM Stores This Summer

BY DIANA DIFRANCESCO

As the ROM unveils its new blockbuster exhibition, *Ultimate Dinosaurs: Giants from Gondwana*, the ROM Museum Store is stocking a gargantuan selection of Dino-related treasures, everything from the official exhibition guidebook, written by ROM paleontologists, to games, puzzles, and an amazing Pterodactyl kite to take flight in the summer skies. There's only space here for a few selections. Be sure to visit the store to see more.

DIANA DIFRANCESCO plans special events for the ROM Governors.



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1. ULTIMATE DINOSAURS: GIANTS FROM GONDWANA
By David Evans and Matthew Vavrek
Written by ROM paleontologists, this latest guide in the bestselling ROM series features the fabulous dino art of Julius Csotonyi.
$5 (tax included). ROM Member price $4

2. BREAKOUT DINOSAURS
Canada's Coolest, Scariest, Ancient Creatures Return!
By Hugh Brewster and the curators of the Royal Ontario Museum
When it comes to dinosaurs, Canada had plenty—maybe some of them lived near you . . . **$9.95 (hardcover). ROM Member price $8.95.**

All items listed on this page are available at the **ROM Museum Store**

Store Hours: 10 am to 6:30 pm, except Friday 10 am to 9 pm. **Kids Store:** Monday to Sunday, 10 am to 5 pm, except Friday 10 am to 8 pm. Check out our online boutique at **store.rom.on.ca**.

3

3. DINO-SOARS KITE
Stand out at the park with this colourful kite, designed to resemble a terrifying pterodactyl. **$19.99. ROM Member price $17.99.**
Why we love it! Made of durable nylon, this kite is easy to assemble, promising hours of summer fun right out of the box.

4. PAINT AND PLAY SET
Design your own dinosaurs with this crafty kit from London's Natural History Museum. Once painted, dinosaurs can be admired as collectibles. **$19.99. ROM Member price $17.99.**
Why we love it! Budding artists can practise their skills by giving dinosaurs a natural look or choosing fun, flashy colour combinations.

4

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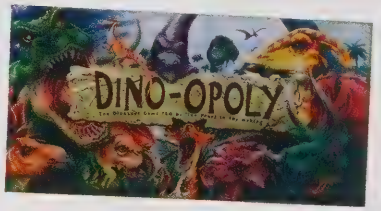
5. DINOSAUR TRAVEL PUZZLE
Enliven long car rides to the cottage with this colourful 100-piece cartoon puzzle, the perfect size for backseat assembly. **$5.99. ROM Member price $5.39.**
Why we love it! The convenient resealable pouch makes it easy to pack and store the puzzle at the end of your vacation.

6. DINO-OPOLY GAME
Enjoy a Triassic twist on the classic board game with this fun, themed version. Rainy days will fly by as players collect bones, buy dinosaurs, and build museum exhibits. **$36.99. ROM Member price $33.29.**
Why we love it! Each dino deed card contains fascinating facts about a different dinosaur, including its size, its diet, and how to pronounce its name.



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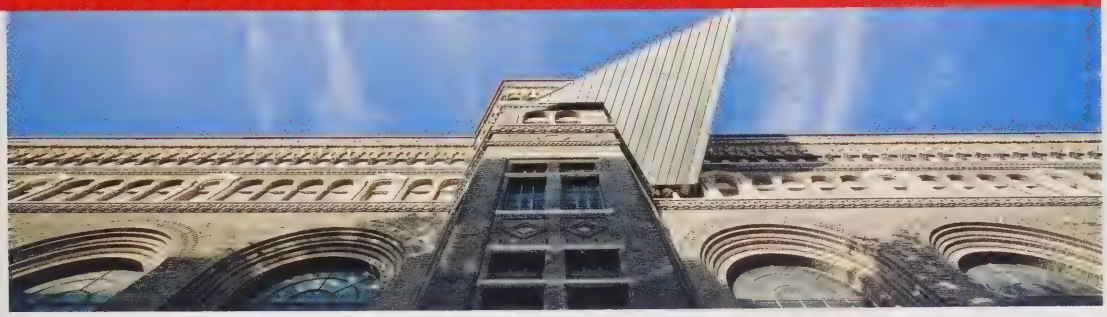
FOR OUR members

The latest offers and information

NEWS / EVENTS / SPECIAL OFFERS / **TRAVEL**



ROM MEMBERS' MESSAGE

A Place to Belong

We're opening more doors to make Members feel at home

Over the past several months the ROM has been surveying museums and other cultural institutions across North America to understand what members care about and what is most important to them. What we have found is that membership is about people's desire to belong to and to support an entity they believe in.

To give ROM Members an improved sense of belonging and a better idea of all that goes on at the Museum, we are introducing a number of new initiatives. First was the Senior Family Membership. Adding this option to our existing membership categories was in direct response to comments from ROM Members. Second, we are launching Face-to-Face gallery tours to take place every third Tuesday of most months. Curator-led tours have been immensely popular in the past and we continue to look for ways to offer more of them to Members.

We are also working toward providing other opportunities for behind-the-scenes peeks into all aspects of the Museum. I have found that some of my own most interesting experiences have happened unexpectedly while travelling from floor to floor in the curatorial centre. It is amazing what rides the elevator here—72-million-year-old alligator skulls, fish DNA, pieces of the moon, busts of Roman generals, not to mention the fascinating and brilliant people that accompany these objects!

Our focus is to bring you such insights into both front- and back-of-house happenings, whether big or small. Improving our communications is another goal as we strive to keep Members better informed about our latest news.

One change you may have already noticed if you've renewed your membership recently is the new design of ROM membership cards. We will be updating the design annually to reflect our newest and most exciting events. The current cards, for example, feature one of the stars of the *Ultimate Dinosaurs* exhibition—*Giganotosaurus*.

This summer, the opportunity to see this enormous southern-hemisphere beast and his friends from Gondwana in *Ultimate Dinosaurs* is our biggest news. Don't miss what is sure to be a spectacular show.

Martha Henderson

MARTHA HENDERSON
HEAD OF MEMBERSHIP AND SALES

MEMBERS BELONG AT THE ROM

FREE FOR MEMBERS

ROM MEMBERS RECEIVE FREE UNLIMITED ADMISSION TO *ULTIMATE DINOSAURS: GIANTS FROM GONDWANA*
See page 40 for details.

MEMBER PREVIEW

ULTIMATE DINOSAURS: GIANTS FROM GONDWANA
FRIDAY, JUNE 22, AND SATURDAY, JUNE 23, 2012
See page 40 for details.

MEMBER INFORMATION

MUSEUM MEMBERSHIP RATES
Individual: 1 year $97; 2 years $172
Family/Dual: 1 year $149; 2 years $269
NEW! Senior Family: $145
Non-Resident: 1 year $102; 2 years $183
Student: $54
Curators' Circle: $189
Museum Circle: $323
Director's Circle: $626
Young Patrons' Circle: $600+
Royal Patrons' Circle: $1,500+
Explorers' Club: $15 (in addition to ROM Membership)

TELEPHONE NUMBERS
Switchboard: 416.586.8000
RPC and YPC: 416.586.5842
Bell Relay Service: 711
School Groups: 416.586.5801
Museum Volunteers: 416.586.5513
ROM Museum Store: 416.586.5766
c5 Restaurant/Lounge Members Reservation Line: 416.586.8095
Donations: 416.586.5660

Membership Services:
416.586.5700
membership@rom.on.ca
rom.on.ca/members

Illustration of *Eoraptor*: Julius T. Csotonyi

Attention Members: Your privacy is important to us. The Royal Ontario Museum (ROM) and the ROM Governors (the ROM's charitable foundation) share a special relationship and you may receive additional information from each.

If you do not wish to receive it, contact membership@rom.on.ca or call 416.586.5700.

Occasionally, we make our list of supporters available to other carefully screened cultural organizations and selected groups that may be of interest to you. Please understand that by allowing us to exchange your name, you are helping us support the ROM's education and research mandates. If you prefer not to have your name exchanged, please contact us at membership@rom.on.ca or at 416.586.5700.

The ROM Membership Department operates a telemarketing office. Should you prefer not to be contacted by telephone, please contact us at the e-mail address or phone number listed above and we will have your number removed from our list.

NEWS

Ultimate Dinosaurs: Giants from Gondwana

Ticketing for ROM Members

ROM Members receive unlimited free admission to the show and are not required to book advance tickets. We do anticipate large crowds, however, so if Members would like to guarantee the time for their visit to *Ultimate Dinosaurs*, we encourage them to reserve tickets in advance. To reserve tickets for yourself or to purchase tickets for guests, visit **rom.on.ca/dinos** or **rom.on.ca/members**.

Ultimate Dinosaurs: Giants from Gondwana

MEMBER PREVIEW

Friday, June 22, 10 am–5:30 pm
Saturday, June 23, 9–10 am

Members are invited to join us for a preview of *Ultimate Dinosaurs* before it opens to the public. Be among the first to see this exciting ROM-produced show and meet the exhibition curator, dinosaur expert David Evans, for a brief welcome at 11 am, 2 pm, and 4 pm just inside the exhibition entrance. Garfield Weston Exhibition Hall, Level B2. For more information, visit **rom.on.ca/whatson** or call 416.586.5700.

Sketch of *Austroraptor.*

Face to Face

A new exclusive series for ROM Members

Each month, Members can meet a ROM expert for a guided walk through the ROM galleries. Our experts will share stories of their latest research, recent acquisitions, or favourite objects. This compelling series, available exclusively to ROM Members, takes place the third Tuesday of each month at 11 am (excluding July, August, and December). The walks are approximately 45 to 60 minutes long, and include time for questions. For a full listing of Face to Face events, visit **rom.on.ca/whatson**. Look for your eNewsletter each month for details of all Member events and offers.

The June Face to Face session features ROM dinosaur expert David Evans.

ROM Discoveries: The Oldest Dinosaur Nesting Site

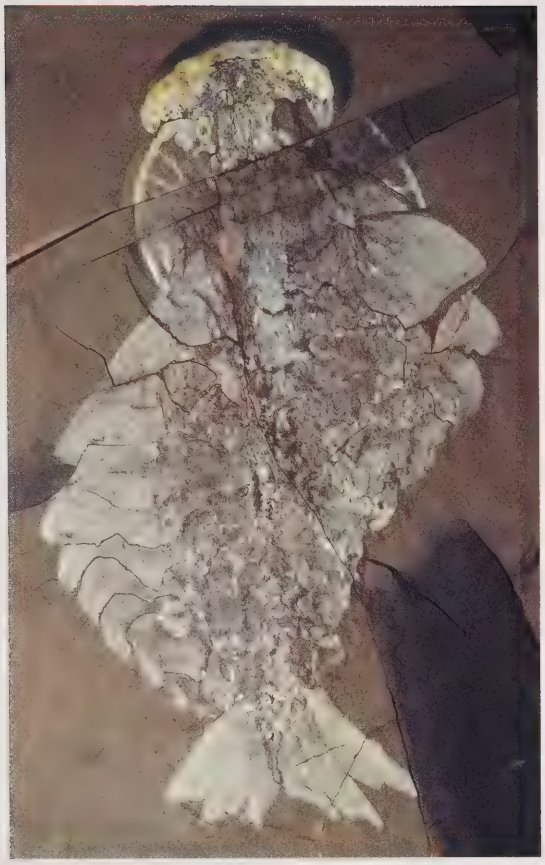
Tuesday, June 19, 2012, 11 am to noon

View newly discovered fossils on this tour of *Dinosaur Eggs and Babies: Remarkable Fossils from South Africa*. You'll hear the inside story from David Evans on his contribution to the discovery of the oldest known dinosaur nesting site, which received international media attention when it was published in March 2012. Registration is required. Space is limited.

ROM Explorers' Club— A Really Cool Club Just for Kids!

Explorers' Club offers events, newsletters, a personal passport, and more. Available for children of ROM Members only. $15 per child per year. For details or to join, visit **rom.on.ca/explorers** or call 416.586.5700.

Photo: David Evans by Ian Morrison. Illustration: Courtesy Julius T. Csotonyi



A terror of the Cambrian Sea, *Anomalocaris* had large grasping claws and a mouthful of radiating teeth. The ROM's fossil of this early relative of arthropods is the world's most complete specimen.

NEW

Friends of Palaeontology

This new Friends group offers an exciting opportunity to become involved in a community of individuals and families who are fascinated by fossils (including those of dinosaurs) and the history of life, and who would like to support paleontology and paleontological programming at the ROM. To find out more or to join, visit **rom.on.ca/members/fp.php**.

Have You Given Us Your e-Mail Address?

Don't Miss Out! By giving us your e-mail address, not only will you receive notice of last-minute events and special offers exclusive to ROM Members, you'll also be helping us in our commitment to being environmentally responsible.

We will not share your e-mail address with any other organization. You may cancel at any time.

Stay in the Know at the Members Info Centre
Drop by our desk in the front lobby for the latest on membership events, programs, and special offers.

Members will also be able to access *ROM* magazine online in June 2012.

NEW

Senior Family Membership

Great value and flexible access for primary cardholders aged 65+. Entry includes the cardholder plus 1 adult and 4 children 17 years of age and under. For more information or to join, call 416.586.5700 or visit **rom.on.ca/members**.

Special Offers for Members

Gardiner Museum

2-for-1 Admission for ROM Members
Present your valid ROM membership card at the Gardiner's admission desk to receive 2-for-1 admission plus a 10% discount at the Gardiner Shop.

Free General Admission to 6 Canadian Museums and Art Galleries

ROM Members can enjoy free general admission to the Art Gallery of Nova Scotia, the Glenbow Museum, the Kamloops Art Gallery, the McCord Museum of Canadian History, the Montreal Museum of Fine Arts, and the Vancouver Art Gallery.

Valid ROM membership card(s) and ID must be presented upon arrival. Admission may not include guests, entrance to blockbuster exhibitions, or ticketed programs and events.

What are ROM Friends?
Friends are a variety of affiliate groups within ROM Museum membership available only to ROM Members. Each group offers extras beyond ROM membership. Cost: $57 per group per year. For details visit: **rom.on.ca/friends** or call 416.586.5700.

Attention Members

The membership program is an important aspect of the Royal Ontario Museum's commitment to public access and accountability. Pursuant to the *Royal Ontario Museum Act*, Members elect 3 of the 21 positions on the ROM's Board of Trustees. A call for nominations to fill one vacancy for a membership-elected Trustee was made in the spring 2012 issue of *ROM* magazine. Danuta Buczynski was elected to a second three-year term of office, effective July 1, 2012, to June 30, 2015, by acclamation.

Danuta Buczynski became a member of the ROM's Department of Museum Volunteers (DMV) in 1987 and has been actively involved in docent training as well as developing and conducting gallery and specialized tours in both French and English. She has also served as DMV president and has co-ordinated many events organized by the ROM and the DMV. The ROM congratulates Danuta Buczynski and looks forward to working with her over the next three years.

New Membership Cards Are In

When you renew your membership, you can look forward to a new image on your membership card. Each year the design will change to reflect our newest and most exciting events.

Anomalocaris, ROM. Art Gallery of Nova Scotia, courtesy the Art Gallery of Nova Scotia

PROGRAMS

Mix Mingle Think

Looking Up: Toronto Goes Highrise
Friday, July 13, 7–9:30 pm
Toronto is fast becoming the skyscraper capital of 21st-century North America. Whether condo or corporate, new towers are changing the face of the city. A lot of us love them—and many of us don't. Speaker: Christopher Hume is the architecture critic and urban issues columnist with the *Toronto Star*. Advance tickets $45, ROM Members $40. All tickets at the door $50.
For details, or to book, visit **rom.on.ca/whatson**.

ABOUT THIS MONTHLY EVENT
Looking for something new and fun to do on a Friday night? Something that's unique in Toronto? *Mix Mingle Think* is a lively event that takes place once a month at the Royal Ontario Museum. The program features an entertaining speaker, followed by a contest called ROMfoolery.

Friday Nights Live @ ROM

Join the party. Dance, fashion, music, photography—it's all here until June 22. Go to **rom.on.ca/fridays** for details.

ROMTRAVEL

Stunning South Africa

FROM DINOS TO RHINOS, AND SO MUCH MORE
Blessed with a wealth of natural wonders, South Africa captivates with its iconic wildlife and millions-of-years-old human history. Dazzling Cape Town has been described as "heaven at the tip of Africa" for its stand-out beauty, set against ocean and the rugged splendour of Table Mountain. The city also offers a diversity of arts and culture, including renowned botanical garden Kirstenbosch, and superb dining accompanied by crisp whites and earthy reds from the country's celebrated wine region.

A tragic period of South African history is put into context with visits to Johannesburg's Apartheid Museum, Robben Island (Nelson Mandela's prison for 27 years), and Soweto township. The Sterkfontein Caves, declared a UNESCO World Heritage site in 1999, contain early hominid fossils dating back more than 4 million years. Guided tours explain how these caves have changed the way we see human evolution.

At more than 19,000 square km, Kruger National Park is one of the largest wildlife sanctuaries in the world, rich in lion, zebra, baboon, hippopotamus, rhinoceros, elephant, and leopard species free to roam in their natural habitat.

Join ROMtravel for a one-of-a-kind tour of this remarkable land. We'll be accompanied by ROM paleontologist Dr. David Evans, who will take us on an exclusive visit to Golden Gate Highlands National Park to see the oldest known dinosaur nesting site. In Kruger National Park, we'll stay at Lion Sands River Lodge, the only private lodge on the banks of the famous Sabie River—it features luxurious thatched bedrooms and game-sighting from a private deck.

> **March, 2013**
Cost: $9,290 (International flight costs NOT included)

Upcoming trips
Turkey September 29–October 15, 2012
Santa Fe September 28–October 4, 2012
Bhutan, Nepal, & Lhasa March 2013
Tuscany and Umbria April 7–21, 2013
The Arctic August 2013
Chicago September 23–27, 2013

Photos: Friday Nights by Kyle Burton. Cheetahs, iStock photos. Vineyard, Shutterstock

FROM THE

rom governors

THINKING OUTSIDE THE CLASSROOM

When people think about the ROM, they often recall defining moments—the building of the Michael Lee-Chin Crystal, the Renaissance ROM Campaign, a glamorous gala. But moments with real impact happen every day at the Museum, experiences that may seem small yet have a significant influence on young lives.

Every year more than 140,000 students visit the Royal Ontario Museum, one of Ontario's largest extra-curricular educators, through the ROM School Visits Program. Developed to complement the province's curriculum, the School Visits Program offers students the novel experience of object-based learning. Touring galleries and handling real artifacts and specimens engages young minds in art, history, world cultures, and sciences in a way not possible in a traditional classroom setting.

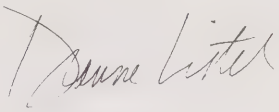
It's the kind of learning that truly sparks imagination. The ROM is fortunate to have many partners, donors, and supporters who have helped us to innovate and expand the reach of our educational initiatives. In the Life in Crisis: Schad Gallery of Biodiversity, the Earth Rangers studio literally comes alive with live Animal Ambassadors and other exciting programs that help build awareness of our growing biodiversity crisis.

The Museum is committed to making its programs accessible to everyone, and through the School Visits Bursary Program, students who may not otherwise have a chance to visit the ROM can enjoy the experience free of charge. Established in 2004, the program has continued to grow thanks to generous support from corporate sponsors, including Great-West Life, HSBC Bank Canada, Imperial Oil Foundation, KPMG, and Linamar Corporation.

Teachers can also conduct their own tours at the Museum with the help of ROM-produced lesson packages. Using the scripted questions and data on select objects, teachers can guide their students on a day of educational discovery. Individual donors such as Currelly Society member Kathryn J. Cameron, who directs an annual gift in support of teacher resources, allow the Museum to continue developing new tools and resources for educators that enhance the learning experience at the ROM.

The Museum continues to develop new and meaningful ways to engage students and innovative ways to teach them about world cultures and natural history. The ROM recently partnered with Fleming College to launch a graduate certificate program in Environmental Visual Communication, the only program in Canada of its kind.

The ROM itself is built on a foundation of teaching and learning, and by aligning our philanthropic work with numerous fascinating research and educational priorities, we help to guide a future generation that will come of age engaged and inspired by the world around them.



DIANNE LISTER
PRESIDENT AND
EXECUTIVE DIRECTOR,
ROM GOVERNORS

Children enjoying arts and crafts at the Museum.

Photo: Dianne Lister by George Whiteside

ROM BOARDS

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CURRELLY SOCIETY : JOHN BOROVILOS

Far left: The extremely rare limestone ciborium in the Joey and Toby Tanenbaum Gallery of Byzantium.

Left: John Borovilos in the Joey and Toby Tanenbaum Gallery of Byzantium at the ROM.

Investing in a Legacy of Learning

When John Borovilos talks about the ROM's collections, his enthusiasm is palpable. A ROM Member since the 1980s, he recalls visiting the ROM as a child and being astounded by the height of the Museum's Nisga'a mortuary totem pole, the tallest from the 19th century. He's never lost that childlike sense of wonder.

The award-winning, Toronto-born educator, who is also a best-selling author, began actively supporting the ROM after wrapping up a 33-year career teaching drama and literature and representing Pearson Education as its National English Consultant. In 2002, he joined the ROM's Department of Museum Volunteers. Borovilos, whose son is also a gallery interpreter, quickly found that the Museum was the perfect place to continue his passion for learning and for sharing his knowledge with others.

As a docent and tour script-writer, today Borovilos conducts some 50 tours a year. "It's a thrill to be here each day," he says. "People do themselves a disservice by not learning throughout their lives. It satisfies the soul and the mind." The section head of the Ancient Greece & Byzantium galleries delights at showing off the newest suite of galleries featuring the cultures of Rome, Nubia, and Byzantium, home to one of his favourite objects—a limestone ciborium, or altar canopy, dating from 500–600 CE, the only surviving Byzantine example from that time and place, donated to the ROM by Joey and Toby Tanenbaum.

Walking with Borovilos, we don't get far before a gladiator helmet captures his attention. He's a natural at bringing objects to life—you can almost hear the roar of the crowds in the forum as he paints a picture of ancient Rome. He is fascinated with origins of all kinds—life, animals, societies, as well as ancient civilizations.

Last year, Borovilos made a further commitment to the ROM by joining the Currelly Society, a group of individuals who have promised future gifts to the Museum. "I thought it was an elite club," he laughs. "When I discovered how easy it was to join, I signed up right away." Asked why it's important to him to support the ROM, he jokes, "Do you have an hour?"

Particularly close to Borovilos's heart is the Gallery of Greece, which reflects his own family origins. Another favourite object, the beautifully carved grave stele of a woman named Iostrate, dates to 350 BCE. Iostrate's family commissioned the marker, which shows her ideal likeness, as a lasting reminder of her presence on Earth. By joining the Currelly Society, Borovilos is leaving a tangible and lasting mark of his own at the ROM.

Discover more about the Currelly Society and join John Borovilos in leaving a legacy gift to the Museum.

For more information on the ROM's Currelly Society, please contact Janice Correa in the ROM Governors office at 416.586.5578 or janicec@rom.on.ca

Photos by Wanda Dobrowlanski. Ciborium, gift of Joey and Toby Tanenbaum. ROM 2010.70.10

PROM: Circus

PROM: Circus on Saturday, March 31, 2012, marked the seventh annual Young Patrons' Circle (YPC) fundraising bash at the ROM. It was a three-ring success—and the best-attended PROM yet. More than 900 young Patrons danced the night away under the big top, indulged in delicious carnival treats, and enjoyed a midway packed with fun-fair activities and live entertainment.

PROM: Circus wasn't only about fun and games—thanks to our generous sponsors, partners, and ticket buyers, the event raised funds in support of leading curatorial research projects and other ROM priorities that help make sense of our changing natural and cultural worlds.

Left:
YPC Patrons and guests get into the spirit of PROM: Circus.

Below:
A performance by a ribbon animator delights PROM guests.

Fact? or Fiction? October 16, 2012

The ROM's trademarked fundraising event *Fact? or Fiction?* returns on Tuesday, October 16, 2012. Guests can expect the same great guessing game with an exciting new twist. Get ready to match wits with 15 pairs of devious curators in an effort to determine the true nature or purpose of mysterious artifacts from the ROM's vaults.

NEW! The answers will be revealed and the lucky winner announced during a gala dinner with ROM experts seated at each table. Reserve your table today for this lively event in support of ROM research and educational initiatives. To purchase a table, contact Keiko Okutsu at 416.586.8064 or keiko@rom.on.ca. For more information on the event, visit **rom.on.ca/factorfiction.**

Curious guests play the ROM's trademarked guessing game at *Fact? or Fiction?*

Photos: PROM, AJ Messier Photography *Fact? or Fiction?* Ryan Walker Photography

SUPPORT

Leading the Way: Royal Patrons' Circle (RPC)

For the past 28 years, the Royal Patrons' Circle (RPC) has attracted a diverse community of people who are passionate about the ROM and are committed to supporting the Museum's work—inspiring wonder and life-long learning through its natural history and world cultures collections.

Exclusive access to special events and behind-the-scenes tours keep RPC Members at the heart of the ROM, deepening their understanding of the Museum's collections and strengthening their relationship with our curators.

Janet Carding, director and CEO of the ROM, and Dianne Lister, president and executive director of the ROM Governors, have both joined RPC at the Fellow Level. "RPC Members are among our most loyal donors," says Lister. "I felt it was important to become a part of this group and experience firsthand the benefits and impact of RPC on the Museum's long-term sustainability." The incredible, long-standing history of RPC support, through the annual contributions of its Members, has been vital to the ROM's stability and it continues to provide an essential source of funding for the Museum today.

In recognition of their commitment to the ROM, RPC Members also have the benefit of transferable membership cards. "It's a great way to share your love of the ROM with your network and introduce your friends and family to the Museum," says Carding. "RPC allows us to pull back the curtain at the ROM, bring people into the Louise Hawley Stone Curatorial Centre, and offer unique opportunities to see objects that are not on display."

The RPC program is a wonderful way to belong to the ROM. Learn more about the program and how you can participate at **rom.on.ca/rpc**.

Royal Patrons' Circle (RPC) Members will enjoy an exclusive preview of the highly anticipated exhibition *Ultimate Dinosaurs: Giants from Gondwana* at the **Patrons' Preview on June 19, 2012**.

Top left: Ruby dinner ring surrounded by 52 diamonds and set in platinum. One of the many behind-the-scenes items available to RPC tours. Rubies occur in a variety of shades and hues within the red range.

Top right: RPC Patrons go behind the scenes in the Museum's Louise Hawley Stone Curatorial Centre.

Bottom: Janet Carding and Dianne Lister in the Life in Crisis: Schad Gallery of Biodiversity at the ROM.

Photos: Ring, ROM M54950; RPC patron tour by Jayne Whitfield; Janet Carding and Dianne Lister by C

SPONSORSHIP

Raymond James Ltd.: Presenting Sponsor of Ultimate Dinosaurs: Giants from Gondwana

On June 23, 2012, the ROM launches the world premiere of *Ultimate Dinosaurs: Giants from Gondwana* presented by Raymond James Ltd. Based on groundbreaking scientific research, the exhibition features the enormous dinosaurs of the southern hemisphere, creatures largely unknown in Canada.

As presenting sponsor, Raymond James Ltd., one of North America's leading full-service investment dealers, is helping to bring these dinosaurs to life through the display of real fossils, 17 full-skeleton casts, and a variety of novel technologies. Curated, designed, and produced by the ROM, what makes this scientifically rigorous exhibition a stand-out is the strength of the Museum's in-house research and curatorial teams, led by paleontologist Dr. David Evans. At Raymond James Ltd., too, it's the people who are the firm's greatest strength. The company's more than 1,000 employees across Canada have worked together in establishing Raymond James as Canada's premier independent investment firm, serving individual investors and their families, as well as corporate and institutional clients.

"We are proud to partner with the ROM to support this one-of-a-kind exhibition," says Paul Allison, chairman and CEO, Raymond James Ltd. "We are confident this show will prove to be a fascinating and fun adventure for dinosaur explorers of all ages."

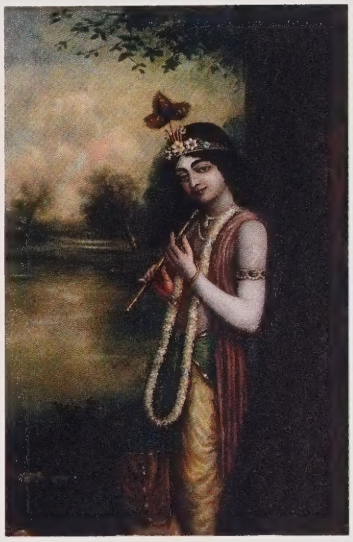
RAYMOND JAMES®

Manulife Financial: Exhibit Sponsor of Embellished Reality: Indian Painted Photographs from the 1880s to the 1940s

Combining the art of painting with the technique of photography has created a distinctive genre of visual culture in India. *Embellished Reality: Indian Painted Photographs from the 1880s to the 1940s*, which runs in the H. H. Levy Gallery until June 17, brings together 75 works from the ROM's permanent collection that have never before been shown in public.

In most places around the world, paint was added to photographs to enhance the realism of a black-and-white image. But in India—where painted photographs were made to commemorate occasions, convey status, and mark rites of passage, such as coronation, marriage, and pilgrimage—paint would sometimes cover the entire print, suggesting that photography served merely as the basis to achieve the other-worldly goals of painting.

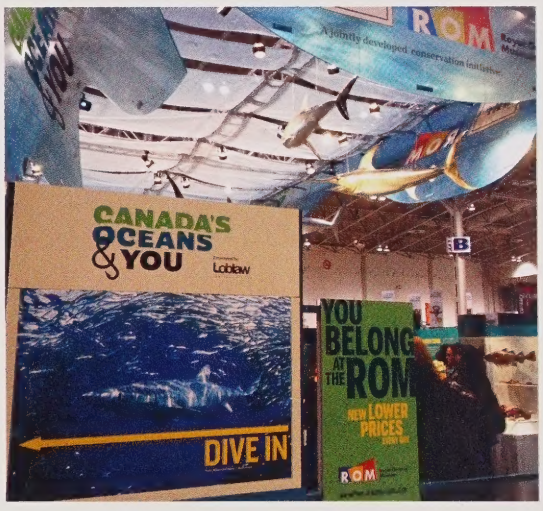
This intriguing exhibition is supported by exhibit sponsor Manulife Financial. A global leader in providing financial protection and wealth-accumulation products, Manulife takes a strong, reliable, trustworthy, and forward-thinking approach to helping with big financial decisions. The company's program of corporate giving emphasizes the power of investing time in giving back to the communities where it does business and encouraging employees to do the same. The company believes that every volunteer hour, every volunteer act, and every hour given back



is an investment in the future of all Canadians. As with its other philanthropic projects, by supporting *Embellished Reality*, Manulife aims to build a stronger community.

Manulife Financial

Loblaw Companies Limited Sponsors Canada's Oceans & You *As Part of its Commitment to the Environment*



In Canada, water is our most precious natural resource. But less than one percent of our oceans are protected, compared to almost 10 percent of our land. Once considered inexhaustible, Canada's oceans are now in crisis. There has been unprecedented loss of biodiversity, and physical and chemical changes are leading to the decline of entire ecosystems. Earlier this year, the World Wildlife Fund and the ROM partnered to present an interactive exhibit, *Canada's Oceans & You*, at Toronto's Green Living Show held April 13 to 15. The aim of the exhibit was to educate the public on this crisis and what they can do to help.

The presenting sponsor of the exhibit, Loblaw Companies Limited, has made its own commitment to being part of the solution. Canada's largest food retailer, Loblaw is working toward a goal of having 100 percent of the seafood in its stores come from sustainable sources by year-end 2013. Loblaw sees respecting the environment as an integral part of its commitment to being socially responsible. "This commitment and our support of programs like *Canada's Oceans & You* play important roles in helping to educate Canadians about the unprecedented crisis facing our oceans and how we can collectively act as change agents," says Paul Us, vice-president, Sustainable Seafood, Loblaw Companies Limited.

Loblaw
COMPANIES LIMITED

Vanity Fare

Top illustrators showed off the latest French designs in the pages of *La Gazette du Bon Ton*, the arbiter of fashion in its day

BY ARTHUR SMITH

In 2008, with the support of the Louise Hawley Stone Charitable Trust, the ROM was able to acquire the complete run of the elite Parisian haute couture magazine *La Gazette du Bon Ton* (translated as *Journal of Good Taste*), founded by Lucien Vogel and published from 1912 to 1925. The magazine showcased the latest French fashions as an art form, securing fashion its proper place alongside painting, sculpture, and drawing. Although trained as an architect, Vogel exploited his relationships with the artistic world of pre-WWI Paris to support his publishing endeavours. He was able to secure the success of the *Gazette* by arranging for its overseas distribution under the auspices of Condé Nast, the American publisher of *Vogue*.

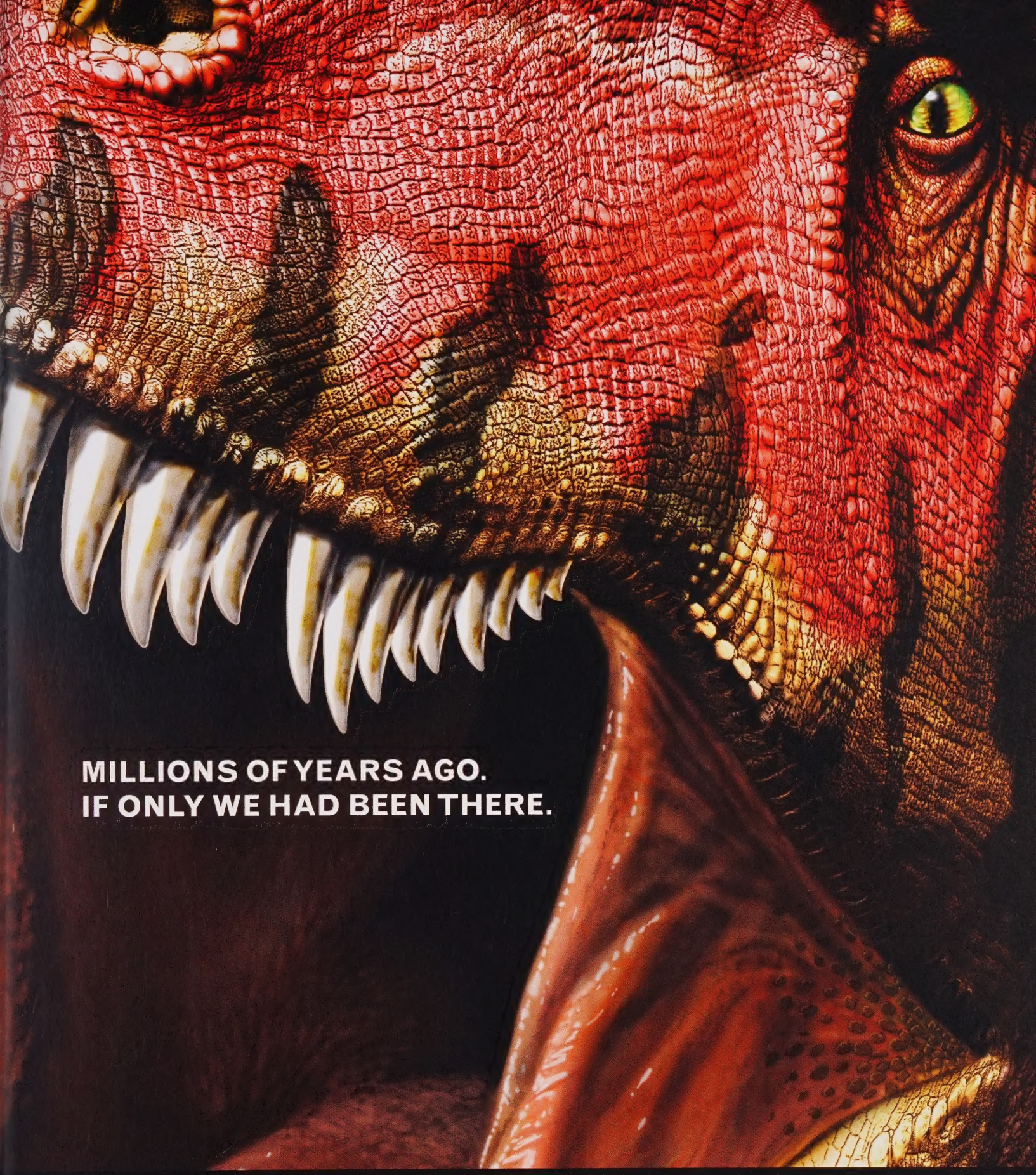
Each issue featured 10 full-page coloured fashion plates by the leading Art Deco illustrators of the period, including George Barbier, Erté, Paul Iribe, Georges Lepape, and André Edouard Marty. Seven of the plates illustrated designs from the major fashion houses in Paris, for which the *Gazette* had exclusive rights. The remaining three were original designs created by the illustrators.

This pochoir print by Parisian artist A. E. Marty (1882–1974)—called "La coquette surprise" from a 1913 edition—illustrates a design for an evening dress from the noted French fashion firm the House of Worth, founded by Charles Worth in 1858 and continued by four generations of the family until it was acquired by the House of Paquin in the 1950s. Besides his work as an illustrator for numerous books, Marty designed posters, costumes, and sets for the theatre and ballet, including the Ballet Russes. His later creations included designs for jewellery, plates, and enamel vases.

This acquisition, combined with extensive ROM holdings of other early fashion journals, such as *Journal des dames et des modes*, *Femina*, and *Art, goût, beauté: feuillets de l'élégance féminine*, positions the ROM as the principal resource in Canada for collections and research in 19th- and early 20th-century fashion design. o

ARTHUR SMITH is head of the ROM's Library and Archives.

Illustration: ROM Archives



Raymond James is pleased to partner with the Royal Ontario Museum to present **Ultimate Dinosaurs: Giants from Gondwana**. Join us on this special journey to meet some of the largest and most unusual dinosaurs to have ever roamed the planet. And don't worry, they may look scary and fierce, but...they are! Enjoy the adventure.

www.raymondjames.ca

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Mary Bell Eastlake R.C.A., "In the Orchard" c.1895, oil on canvas, 38" x 33"

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